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FACTS, FIGURES AND INTERESTING COMMENTS ON RESEARCH RESULTS

	1980	1981	1982	1983
1980	100	100	100	100
1981	100	100	100	100
1982	100	100	100	100
1983	100	100	100	100

A. J. Carlson, Author

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PREFACE

The WHO and the ORSEP requested the Indian Institute of Public Administration to do an evaluation study of water supply and sanitation as components of primary health care and development. The Government of India through the CRWHO was also involved in the study. The ORSEP/WHO Joint Conference on Health Policy had prepared a research design proposal. The research design called for a general evaluation of the programme in the country as a whole. It also called for studies in "pockets" and village levels. An informal advisory group consisting of representatives of WHO, WHO/CRWHO and the IIPA was formed. The advisory group considered the programme in view of the very short time that was available for preparing the study. It had been decided that case studies would be carried out in the States of Rajasthan and West Bengal. These studies in their turn were assigned to the University of Rajasthan in Jaipur, Rajasthan, and the Gandhinagar Rural University at West Baid. The following were responsible for the studies:

- | | | |
|-----------|---|---------------------|
| Rajasthan | - | Professor L. Kaula |
| | - | Dr S.S. Panda |
| West Baid | - | Dr S.S. Puri |
| | - | Dr G.A. Subramanian |
| | - | Dr S. Subramanian |

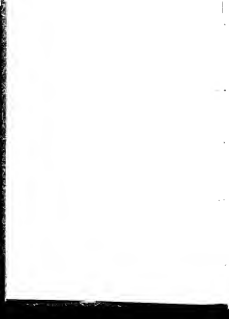
The two Institutions have done a very commendable job within the short time that was available. The two case study reports were extensive and it was not possible to incorporate them in their entirety in the final report. They have consequently been condensed considerably and it is hoped that the condensed version provides a realistic summary of the situation with regard to water supply and sanitation in the two states. The work done by the two Institutions is greatly appreciated.

The report of the national level was prepared by the national coordinator, Dr A.P. Karmacharya, with the assistance of Dr S.S.S. Bhargava, of the Indian Institute of Public Administration. The national coordinator also prepared the introduction of the two state reports and put the reports together.

The national coordinator acknowledges the cooperation from WHO, ORSEP and CRWHO. Without their cooperation and support it would not have been possible to complete the report in such a short time. Thanks are also expressed to the Director of the IIPA, Dr S.S. Bhargava, who not only allowed the study to be undertaken but gave all necessary support and encouragement. The responsibility for the views expressed in the report, although discussed with the advisory group, is that of the author.

Table - 1

Objectives and Design of Study



RELEVANCE OF THE STUDY

Continued availability of people, water and electricity resources in Guyana are not only the backbone of basic but also of the basic patterns of development. While this is accepted as a truism, it is necessary to stress that the fundamental development and well-being of a community is dependent on the effective use of these resources.

The present study is a part of an interest and action related to the supply and consumption of resources. The interest is not only in how things are but also in the design process proposed by the GUYANA GOVT. Division of Health Policy. The study is part of the effort to assess the programme of water supply in relation to a series of other areas that have a part in the water supply and development, and, therefore, to study the extent of community participation in the programme.

It is necessary to stress at the same time that the study is to be confined to the situation in rural areas, hence any policy recommendation will be made in the same situation. It is also to outline the purpose of the study, most specific aspects which are bearing on the implementation of the water supply and sanitation programme need to be considered. These include rural development, agriculture and health programme.

The financial resources and organizational factors have not to be taken into account. The effort to involve the community in the programme and the response of the community will also be studied.

The purpose of the GUYANA GOVT. design process was that:

- (i) Lack of community involvement and
- (ii) Lack of intersectoral coordination are responsible for failure of programmes.

The design process further assumes that there is a lack of coordination between the programme of community water supply and other programmes of primary health care as well as with developmental efforts in other sectors. The attention of this failure has resulted in greater emphasis being given to transport development.

The data that are being gathered, are essentially to test the validity of these premises and consequences with reference to the situation in GUYANA.

Research Design

The data in this study gathered at three levels - national, state and local. The information collected at the national level refers to

National policy, Organization at the Central (Federal) level, Design alternatives, Constraints/limitations, Achievements or national levels with regard to water supply and sanitation programmes, Training of personnel and perspectives for the future.

At the state level information was gathered in the same areas

At the local level, information was gathered as to the availability of potable water and the extent of its utilization when available. The subsample that was administered had questions on knowledge and attitudes towards health, safe drinking water and sanitation. The extent of people's participation and consultation either in obtaining safe water supply or in maintenance was also studied.

The time available for the study was extremely limited (about 18 weeks). It had been decided to restrict the study stations to two states - Rajasthan and Tamil Nadu. These two states were chosen because they have acute problems of water scarcity. Rajasthan has a vast stretch of desert. Tamil Nadu has widespread dry areas. Besides this, there are variations with regard to the organization, financial resources and people's participation in the two states. It was assumed that these differences would provide some insights into the implementation of water supply and sanitation programmes. Both the states are rather large. Given the short time it was decided that the study at the village level would be confined to one district and within the district to only two blocks. It was decided to select 10 villages and 10 respondents in each village. The respondents were interviewed on one of three villages in order to gather data on the aspects already mentioned. It was suggested that 5 villages should be selected where a drinking water supply programme has been implemented and two villages where the programme had not yet become operational. The data were thus collected from 40 respondents.

At the village level information was collected on population distribution, occupational patterns and other socio-economic conditions. These data have been presented as a part of the report (see appendix 1 and 2).

In order to carry out field investigations an institution was identified in each of the two states. The three systems of these two institutions with the IIT which was coordinating the study was held in late November, 1972 - a common research design and questionnaire were developed. The questionnaires had to be translated into the regional languages in order to be administered to the local people.

this last time. The field work started in the second half of January and was completed in the second half of February, 1974. The subchapter, analysis and wrapping up of the report had to be done in a very short time. One of the major considerations in the study was that it had to be completed in 10-12 weeks.

The present report could be considered as an interim report. There is need to look more closely at the data. It was, however, agreed when the study was undertaken that it would only be indicative. In only two states have been studied and even within them only a small number of villages in one district. It has not been possible to arrive at substantial general conclusions. There is need for a much deeper study. The information collected in the two states should be collected for all other states. Moreover, the data should be collected in each of these states from different geographical areas as they are very varied within the state (rural tracts areas, official areas, drought prone areas, heavy rainfall areas, etc.).

In the present study the financial constraints also make it necessary to restrict the study to very limited geographical areas. However, looking over the data, one can see sufficiently that substantial data were collected. It is possible to suggest some tentative conclusions as well as give some guidelines with regard to policy, organization and implementation.

Methodology

A substantial part of the data has been collected through available documents. The limitations of these documents is that it is not possible to get the most up-to-date statistics. The study has had to rely to a very large extent on the data of the Fifth Five Year Plan. It is expected that the Sixth Five Year Plan draft report would be available soon, but it was not possible to wait for this. Efforts have been made to update the data in the extent possible through discussions with the various statisticians and departments.

Summary of the Report

Part I deals with the problem and the methodology. Part II gives background information on the context and policies with regard to rural development, agriculture and health. Part III provides an analysis of water supply and sanitation programmes. Part IV contains case studies of the two tracts. The last Part V gives a history of the findings, and highlights the important aspects which need to be considered in the future with regard to water supply programme.

PART - II

Country Background and Policies

Background Information

Population

India is the second most populous country in the world, and third in the world's largest country, averaging an area of 3,297,295 square kilometers. According to 1971 census, the country had a population of 347.33 millions - urban 128.79 million and rural 218.54 million. About 85% of the population lives in rural areas. The overall increase of population between 1941-1971 was 34.5%. In 1961, 81% of the total population lived in the urban areas, and this increased to 85% in 1971, an overall increase of about 3.2%. The growth rate of the rural population between 1941-71 was approximately 3.5 per cent. The estimated population for 1980 is 420 million. The proportion of urban to rural remains about the same.

Government

The constitution is federal in structure with unitary features. The President of India is the constitutional head of the executive and the union. The jurisdictions of the union and the states are demarcated under the Constitution. A system of self-government also functions. The parliamentary system of government of India is based on adult franchise whereby all citizens of India who are not less than 21 years of age have the right to be registered as voters in any election to the union and to the states. There is a separation of legislative, executive and judicial functions. At the union (national) level, the President is elected by an electoral college. The Vice President is also elected in a similar manner. There is a Council of Ministers headed by the Prime Minister. Each minister has a Secretary to advise the minister on policy and administration.

At the state level, the executive consists of the Governor and a Council of Ministers with a Chief Minister as its head. The Central Administration is under the Collector who is responsible for the collection of revenue and maintenance of law as well as development programmes. In many states Cooperatives have been established for rural villages under specific acts of the state legislatures. These are headed by an elected member. But all other towns and cities there are municipalities having elected members and councils which elect their own President. The system of Panchayati Raj or democratic decentralization functions a three-tier system of local-level government body at the village, block and district levels. Specific powers and functions in the field of development and local administration have been assigned to panchayat city institutions.

Economic Conditions

India is rich in the nature, resources and manpower. However, these resources have not been exploited fully. The Indian economy is still predominantly agricultural, about half the national income is derived from agriculture. About 75 per cent of the people are dependent on agriculture. There has been concerted effort to develop the country by increasing the pace of industrial development and also agricultural productivity. The GNP in 1960-61 was Rs 479 776 million. In 1973-74 it was Rs 644 580 million. The national net capital stock was estimated to be around Rs 450 000 000 in 1971. The national net capital stock for 1980-81 was Rs 740. However, the index of industrial production in 1973-74 was 107 in 1980-81.

The census divides the regions into nine categories. According to the 1971 census out of 241 millions, 189 million were workers. About 118 million of them were engaged in either cultivation or agricultural labourer, about 20 million were engaged in manufacturing, processing, etc., while about 60 million are in trade and commerce, 11 million others are those working in transport, storage and communication.

The number of non-workers is around 110 million. The unemployment problem is quite serious. A very large number are registered in the Employment Exchange (about 8.8 million). However, this does not give the full picture as registration in the Employment Exchange is voluntary.

Education and Health

The literacy rate in India has gone up from about 17 per cent in 1954 to about 30 per cent in 1971. It is estimated that about 64 per cent of children in the age group of 5 to 11 are enrolled in schools in the 25 per cent about 25 years ago. The allocation for education expenditures was Rs 1 120 million in the First Five Year plan and Rs 12 500 million in the Fifth Plan. The constitutional directive provides for free and compulsory education for the age group of 6 to 14.

A great deal of emphasis is also laid on child education. In the recent years, emphasis on child education programme has shifted from child literacy to functional literacy and non-formal education programmes. Special steps are being taken to provide opportunities for education of women. The overall literacy among women is about 17 per cent as compared to about 34 per cent among the men.

A scheme for rural higher education was launched in 1971 for providing secondary education to rural youth. The project focused on these institutions were to be engaged in rural developmental programmes at the regional and state levels.

The welfare programs in India includes many activities for the welfare of women (conditional housing schemes, provision of education of adult women, women organizations, etc.). For children, the programs include nutrition programs, integrated child development services, foster care homes and governmental development services. Various programs for improving the status and conditions of the backward classes have also been worked out by the Social Welfare Department.

The Rural Areas

More than two-fifths of India's population is in the rural areas. The number of villages is estimated to be 570,000. In the rural areas about three-fourths of the population depend on agriculture. As such, the income of rural households is directly related to the size of the farm holdings and their productivity or the wage employment provided in the farm sector. As per the Agricultural Census Report 1970, 15.2 million operational holdings were in the size group of less than 1 hectare, and another 21.4 million in the size group of 1-4 hectares. Holdings in the size group of less than 1 hectare constituted 19% of the total holdings.

The area under the operation of holdings in the size group of less than 1 hectare forms 7% of the total area under cultivation and 58% in the size group of 1-4 hectares. Thus 63% of the holdings in the size group of less than 1 hectare accounted for only 19% of the total area under operation. Besides the preponderance of tiny size of farm holdings, there are vast areas of permanent cultivation - a fact which further accentuates rural poverty. It is estimated that about 200 million hectares (i.e. the arid and semi-arid areas), another 25 million hectares of land is subjected to frequent floods, and 70% of the gross cultivated area is usually dependent upon the vagaries of rainfall having no means of irrigation facilities.

According to 1971 census, of the total rural population of 418.8 million, the number of workers was 160 million (38%) and nonworkers 258.8 million (62%). The census categorized a person as a worker or non-worker according to his main activities as reported by him. Among the workers, 58% were cultivators, 28% were agricultural laborers, 10% were working in the service of households, industry, fishing, plantation, etc. and only the remaining 4.4% were engaged in activities like mining and quarrying, manufacturing and processing, household industry, construction work, trade and commerce, transport and other services. The non-workers included those in household duties, retired persons etc.

The 'total poor' by and large consists of small and marginal farmers (having land holdings less than 2 hectares), tenants, share croppers, landless agricultural labourers and casual workers. Of the 40% male workers engaged in directly working on land, only 44.4% are volunteers having rights of ownership or possession over the land. The remaining 55% are landless agricultural labourers with no rights whatsoever on land. The percentage of volunteers to total agricultural workers declined from 72% in 1961 to 48% in 1971. On the other hand, the percentage of agricultural labourers increased from 28% in 1961 to 52% in 1971.

The problems of health, water supply and education are much more acute in rural areas as compared to urban areas. The development plans are described in a later section.

Initiation

The present study is concerned with the question of incorporation of water supply and sanitation programmes not only with health but also with overall development programmes. An essential part of the study is confined primarily to rural areas. In order to provide the integrated nature of the problem it is necessary to have a brief look at policies and programmes that relate to rural development, agriculture and health.

Rural Development

It has already been mentioned that more than 80 per cent of the population of India live in rural areas. After Independence (1947) substantial emphasis was laid on rural development.

The Community Development Programme was launched at the end of 1952. The basic objective was to ensure the fullest development of the human and material resources in an area under and thereby raise the rural community to higher levels of living with the active participation and on the initiative of the people themselves. One could say that the basic objectives remain the same although there have been changes in the strategy and programme. For accelerating Community Development, the country was divided into about 500 blocks, each block has about 100 villages with a population varying from about 45,000 to 100,000. The Block Development Officer with 3 Executive Officers who are subject specialists (Agriculture, Animal Husbandry, Cooperatives, Industry, etc.) was in charge of the programme. The Community Development Programme has now spread almost the entire country.

In 1958 a congress was set up to evaluate the committee development programmes. This committee felt that the response of the people was not sufficient and as such suggested the establishment of institutions which would enable the people's participation. These institutions were called *proshchinsk day* (*proshchansk*) and had a three tier system - district, block and village. The pattern is still operational.

In 1960, the National Agricultural District Programme (NADP) was taken up in 12 districts, one in each state. It has also been known as "package programme". The idea was to provide all the inputs which were necessary to increase agricultural production. The effort was essentially to maintain the productivity in those areas which had better equipments in terms of land, water and climate. The inputs provided were fertilizers, white seeds, pesticides, improved agricultural machinery, irrigation water, etc.

An assessment of the rural development programme indicated some gaps. It was felt that in spite of the various programmes not all the sections of the village population were benefited. The strategy in the Fifth Plan was that the development in the rural areas was to encompass both support and integration to all relevant programmes leading to increased agricultural production and protection of employment among small farmers and agricultural labourers. The minimum needs programme was to be implemented as a major mode.

The minimum needs programme was evolved during the Fifth Five Year Plan. This programme developed as the analysis of the programme in rural areas had indicated that the provision of social amenities had failed to have the desired impact. The contents of the minimum needs programme were as follows:

1. Facilities for elementary education for children up to 14.
2. Creating a minimum uniform availability of public health facilities which would include preventive medicine, family planning, maternity and the provision of early morbidity and adequate arrangements for referring serious cases to an appropriate higher echelon.
3. Supplying drinking water to villages suffering from chronic scarcity or having unsafe sources of water.
4. Provision of all-weather roads.

¹ Package was the nomenclature of traditional village council.

4. Some-what for livestock labourers in rural areas,
5. Carrying out the organizational improvement of them,
6. Increasing the spread of electrification to some approximately 20 to 40 per cent of the rural population.

There is continued emphasis on improving the living conditions of the people in rural areas. The strategy is to take an integrated approach to development.

As indicated earlier, the programmes described have not had the expected impact. There were paying disparities. Consequently, special programmes were introduced for specific groups or areas, among these the important ones were

1. Drought prone areas programme.
2. Small Village Development Scheme.
3. Small farmer development agencies.
4. Marginal farmers and Agricultural labourers development.
5. Integrated small development programme.
6. Land development programme.
7. Applied Nutrition Programme.
8. Scheme for Rural Employment, etc.

It is not possible to go into details of any of these programmes. However, description of one or two programmes would be of interest. The drought prone areas programme covers the most chronically drought affected areas. Its major thrust is to restore ecological balance. It is in operation in 34 districts. The approach is to have a comprehensive area of development. It aims at optimal utilization of land, water and livestock. Programmes include water irrigation schemes, rural communications, soil conservation, afforestation and improving water supply. Further, the programme had focused on creation of rural works and employment generally.

The achievements in rural development are quite impressive. Nevertheless, there are wide areas to be covered. The policies and programmes which are emerging are an effort to bring about development of all areas and all segments of people. This is the essence of the approach to integrated rural development.

Agricultural Policy

About 15 per cent of the population is dependent on agriculture and allied occupations for their livelihood. About 120 million hectares are under cultivation. Of this area about 15 per cent is irrigated. The outstanding features of agricultural production are - wide variety of crops and the preponderance of food crops over non-food crops. The overall food production was about 120 million tonnes in 1964-65. The food situation is fairly comfortable. During 1971, 2 million tonnes of foodgrains were

measures to supplement the domestic supply. There is a public distribution scheme through fair price shops particularly in the urban areas. For wheat, rice and sugar, minimum support prices or an essential feature of the policy for many years. Procurement are prepared by government for public distribution at the support prices. To impart stability to the country's food and economy, the Central Government has built up a supply of nearly 3 million tonnes of ricegrains in 1952, it is now thought to be about 3 million tonnes.

The policy with regard to agriculture can be described under the following headings:

Agriculture development programs, Agricultural marketing, Agricultural Research, Agricultural Education, Land Reforms, Animal Husbandry, Forestry and Fisheries.

With regard to the development programs some facilities were brought under the intensive agricultural districts programs to which reference has already been made in discussing the rural development policies.

Watership reaping was initiated to increase the intensity of land utilization through optimal use of the existing irrigation facilities as well as new irrigation schemes.

The high yielding variety programs which was initiated in the late thirties is being continued. It was expected that it would cover about 45 million hectares by the end of Fifth Plan.

The programs included provision of fertilizers and quality seeds. Substantial attention is being paid to soil and water conservation. There are efforts to promote integrated agricultural development in dry areas of the country. The drought prone areas program has already been mentioned. The programs in land reform included abolishing of intermediaries, tenancy reforms, distribution of landless, land ceiling or holdings, and consolidation of holdings.

The progress of measures on which agriculture is dependent has been so necessary to accord a high place in National Development Plans for irrigation. About 600 irrigation projects were taken up since independence out of which a little more than 500 have been completed. The total irrigated area in the country which was about 25 million hectares in 1950-51 had gone up to 45 million hectares at the end of 1954-55. An assessment of the total investment of the country has been made (The details of this assessment are given later).

The approach to agriculture development is essentially in nature self-sufficiency in the foodgrains.

These programmes are an effort to help in achieving their objectives. Apart from them, underprivileged groups are being covered by through programmes which specifically for them. The need for spreading the benefits of the development programme to all sections of the rural society is realized. Distributive justice with growth is the accepted objective.

Health Policy

The data with regard to population have been given earlier. Expectation of life has gone up from 51.4 years in 1940-41 to 54.4 in 1954-55. The infant mortality rate which was 286 per 1000 in 1941-42 has now declined to be 151 (151 in rural areas and 81 in urban areas). There are 2.5 hospital beds available per thousand population which is about half the desired norm. For every 4000 people, there is one doctor and for a population of 4000 one nurse is available. It must also be noted here that these figures do not indicate the total situation as there is wide difference between the urban and rural areas. The medical staff and nurses available in the urban areas is very much higher.

The per capita expenditures on medical services and public health during the years 1951-52 is estimated at Rs 3.1 (Rs 11.15). There is wide variation in the country with regard to the expenditures on medical services and public health, while it is Rs 4.5 per capita in Singapore, it is 11 in England. The majority of the large states spend less than Rs 10 per capita per annum. The smaller states tend to have a higher allocation per capita. At the end of 1956, there were 3375 primary health centres (described later) and about 14,000 sub-centres.

The number of cholera cases reported in 1951 was about 21,000, in 1952 - 27,500 and in 1953 up to September - 7,115. In 1955, there were 1,120 deaths, in 1956 - 981 and in 1957 - 449.

In 1954-55, there have been no reports of dengue. In 1955, the reported cases were 1426 with 179 deaths. In 1956, there was no epidemic. The reported cases in that year were 140,000 with 11,400 deaths.

In the Malacca the total number of cases reported in 1953 was 1,428 420 and in 1954 it was 3,130 280. While there were no deaths in 1953, there were 40 deaths in 1954.

The major causes of deaths in the rural areas according to a survey were:

Drought and diarrhoea of the new-born, women	12%
Fever	14.7%
Various poisons to which	18%
livestock	19%
accidents and injuries	25%
Disturbance of the circulatory system	31%

The present health policy has evolved over a period of time. The most important objective of national public health policy is to ensure basic (vital) health care to the great majority of people in the country. In India, more than three decades ago the Shree Committee in its report emphatically recognized the need to organize health services organization and medical education to meet the comprehensive needs of the population. The committee recommended setting up a network of primary health centres to cater to the preventive and curative health care needs in rural areas, a supportive network of secondary health centres and district hospitals for surgical and other advanced services and expansion of education and training facilities for health services personnel. The recommendations of this committee are being progressively implemented as part of health services development programmes launched in the different Five Year Plans.

During the First Five period Primary Health Centres (PHCs) were set up as part of a national rural development scheme called "Community Development" with a very modest staff in each centre to cater the needs of integrated health services and action in the field of about 50,000 to 100,000 population in a block. After the Centres were in operation for some time it was realized that they were not able to cater to the comprehensive health needs of the population they were supposed to serve. Consequently, the Minister Committee (1961) after reviewing the situation recommended closing down the care of development of new PHCs, but strengthening the existing ones.

There are 1,071 PHCs and 14,008 sub-centres in the country. These Centres provide basic medical care to the community. A PHC centre + population of about 100,000 and has one or two doctors plus about 40 para-medical staff.

² See Health Care Services (Short Plan), Ministry of Health and Family Planning, Government of India, New Delhi

It is doubtful whether the setting up of these centres has resulted in significant improvement in the health status of the rural population. India still ranks low in the "Physical Quality of Life Index (PQLI)". When compared to other areas of the world, in spite of the emergence of Rural Health Centres, the health care services in very limited in the rural areas and the amount of preventive and promotional health care and injury provided for in the health delivery system. The major emphasis of the existing health care is on curative services, while the majority causes of morbidity among the Indian Population like in the area of communicable diseases from the existing services are not reaching the people adequately thereby resulting in continuing ill health and increased morbidity and mortality.

It has been realized that Government cannot do enough alone merely by increasing the number of doctors or the output of medicines, but only by making each individual realize the need for simple steps in sanitation, promotion, prevention and, of health activities which can make remarkable changes in the morbidity and mortality pattern in this country. An conscious and adequate effort has so far been made to involve the community in taking care of itself and seeking assistance when such assistance is needed.

In the Fifth Plan the aim was to provide minimum public health facilities integrated with family planning and nutrition for vulnerable groups, children, pregnant women and lactating mothers.

1. Increasing accessibility to health services in rural areas,
2. Intensification of the control and the reduction of communicable diseases especially Malaria and Scellpox,
3. Development of referral services by providing specialists in the upgraded primary health centres in rural areas,
4. Qualitative improvement in the education and training of health personnel,

Having realized the need to take the health services available at the village level, the Ministry of Health has chalked up a new scheme known as "community health workers" for strengthening health care services at the rural areas. The purpose behind this scheme is to provide adequate medical care to the rural people and at the same time to educate them in matters of prevention and promotive health.

Under the new scheme every village with a population of 1,000 will be expected to select its own representative - one who belongs to the community, enjoys its confidence and has the capacity and competence to serve it in the area of health. The representative is given suitable training in tackling simple and basic health problems. The workers are free to attend to their normal vocations - agriculture, teaching, craftsmanship, etc. They will provide health services to the community on their spare time for one or three hours every day. It is expected to benefit about 300,000 community health workers in the coming years. The community health workers are expected to give medicines to people referred to the people. For more serious illness, they will refer the people to District Health Centres. However, the major function of the U.M.S. is one of education.

In the same way a large number of people make use of the indigenous system of medicines. There are about 20,000 registered practitioners of this system, 15,000 dispensaries and 200 hospitals which provide medicines following the indigenous system and their functioning. The policy is to evolve a uniform standard of medicines in the Indian system of medicines. A council which was set up in 1971 has finalized uniform syllabi for undergraduate education, some post-graduate education is being imparted in a few institutions.

PART - 201

Water Supply and Sanitation Program:

Water Supply and Sanitation Programmes

In the previous sections the rural development, agriculture and health policies have been briefly described. It is only in the various water programmes that a concern for water supply has been indicated. When the Central Public Health and Environmental Engineering Organisation (CPHEEO) was established in 1954, it was called the Ministry of Health. In 1971, it was transferred to the Ministry of Water and Powering.

The coverage of Political Programmes and the Machinery for implementing the rural Water Supply is described as under.

Historical

During the pre-independence era the Public Committee (PCW) was appointed by the Government of India to review the general health problem including the availability of safe drinking water supply in a national scale. The Committee made a number of recommendations, and suggested that the target should be to provide safe water for drinking purposes to the entire population, within a period of 20 years, with the following priorities:

- (1) places where there is incidence of cholera and other infectious diseases,
- (2) important places for defence and districts,
- (3) places located on important lines of communication and
- (4) places where there is difficulty in obtaining water during the hot weather.

After independence the Government of India appointed another Technical Committee (TCW). The Environmental Hygiene Committee, to look into the same problem. The Committee recommended that water supply facilities should be provided to 50% of the population within a period of 10 years. It laid down the following priorities for accomplishing this task:

- (1) pilgrim centres
- (2) places where the annual death rate due to cholera was more than 500 per 100,000 persons for the last ten years and
- (3) water scarcity areas

It also suggests that the design, construction and maintenance of Public Health Engineering Works be entrusted to Public Health Engineering Superintendents.

Between the years 1948 and 1951, the Union Ministry of Health set up 3 independent agencies viz., (i) Rural Team of One Planning Commission, (ii) a three-man team sponsored by Health and (iii) the National Water Supply and Sanitation Commission.

The National Water Supply and Sanitation Commission set up by the Union Ministry of Health made a comprehensive review of water supply and sanitation in the country and suggested significant organizational, financial and procedural reforms.

An Advisory Team of the U.S. Public Health Service visited India during early 1949 at the request of the Ministry of Health to review the implementation of the rural water supply schemes in the country as a whole. The team visited various parts of the country and suggested the setting up of a single agency at the state level, with a separate organization, for the coordination and development of rural water supply schemes. The team specifically recommended that this organization should be responsible for the supervision, operation and maintenance of all rural water supply schemes and also be responsible for the training of staff required for maintenance.

In short, all these committees have stressed that implementation of water supply schemes in rural areas be given due importance and that sufficient funds be allotted to achieve the objective within a specified period. Unfortunately, due to financial and other constraints, the recommendations made by the various committees could not be properly followed. A beginning has been made to solve the problem since the First Five Year Plan and the implementation is in progress though at a very slow rate.

Assessment of the Existing Water Situation

As early as in 1951, the Ministry of Health felt that an assessment of the rural water supply problem, particularly with reference to the sandy areas and the overfill wells, was necessary to make a comprehensive plan of implementation. Simultaneously, the Community Development Department conducted a survey on the availability of drinking water in the rural areas from single wells. The survey revealed that there were about 12,000 villages and hamlets without any source of drinking water. Through the Special Investigation Divisions set up in the states, it was possible

to identify the nature of problem villages in the areas under these categories, viz:

- (1) Villages where the drinking water was not available within a distance of 1/2 km or a depth of 30 ft.
- (2) Villages where the sources of supply were prone to endemic diseases or poisonous substances, and
- (3) Villages where the sources contained excess of chloride, fluoride or iron in the water.

The first category was defined as scarcity and difficult villages while the second and third categories were defined as health problem villages.

The information received from various sources revealed that there were 70,458 villages in the country situated in the difficult and scarcity areas, 21,422 villages in the endemic endemic areas, 1,125 villages in the poisonous infected areas and 21,178 villages in areas where the sources contained excessive mineral constituents such as chloride, iron and fluoride.

It may thus be seen that there were approximately 113,000 villages in the country in the difficult and scarcity and other health problem areas. It was considered necessary, as a first step, to give priority for providing safe water supplies to villages exposed to endemic diseases and poisonous infestation. The next step was to tackle the other problem villages. Unfortunately, the implementation did not materialize as envisaged and so far about 46,000 villages only have been covered leaving a big gap of 113 000 villages.

Incidence of Waterborne and Water-related Diseases

Waterborne and allied diseases are responsible for a large incidence of mortality and morbidity in the rural community. This could be brought under control by establishing protected water supplies and sanitary methods of excreta disposal. The data available from the various studies show the seriousness of the environmental health problem and the methods of villages and people affected by the various water-borne and water-related diseases in the country (of which 15 000 villages are in the areas of high risk) comprising a population of 24.26 million in areas which are endemic in diseases.

The Government's village program have been estimated by UNICEF as to about 1,184 such a population of 1.84 million in all states excluding Rajasthan, where a further 2,496 villages are affected. The higher percentage of the damage in Rajasthan is because of the resistance of crop soils.

Villages with high seasonal incidence such as Hoshiarpur, 1959 are, however, above the acceptable standard, have been found to about 15,000 villages with a population of approximately 21.81 millions. The disease incidence has been found to be as high as 50 per 10,000 men and girls in Punjab, Haryana, Uttar Pradesh, Rajasthan and Andhra Pradesh are affected.

The impact of water supply facilities on the community will have far-reaching effects not only on the present health conditions but also on the national production in various sectors of our economy. There is sufficient evidence to show that a mere majority of the people, both in the urban and rural areas suffer from communicable diseases, out of which more than 50% may be attributed to waterborne infections. Not to give sufficient services, a large population is affected by diarrhoea, dysentery, typhoid and other acute-and-chronic diseases every year. It has been considered advisable that control of spreading large scale of many communicable diseases, the diseases could be controlled by preventive measures with less expenditures.

It is estimated that 1,700 million man hours are lost every year due to the sickness of people who are incapacitated by waterborne diseases. It is also further estimated that the nation is losing about Rs 4,000 million per year on account of treatment, sickness and loss of production.

Rural Water Supply Program

Introduction

Since 1946 has already been explained, it is obvious that there has been an awareness of the problem of drinking water in rural areas. Programmes have been initiated to meet the needs of the rural people. The programmes in the past as well as the plans for the future are described in the following pages.

Since the commencement of the First Five Year Plan, four different programmes have been implemented for the development of rural water supply in the country viz.,

- (i) The Community Development Works Programme
- (ii) The Rural Development Works Programme

(CII) New Tuscany's Program for Regional Classes, Technical Centers and Technical Trips, and

(CIV) The Regional Water Supply and Sanitation Programs.

The Community Development Programs, administered by the Ministry of Economic and Cooperation, was confined to the construction of urban dwellings which could be constructed by local development agencies. This program has now been merged with the National Water Supply and Sanitation Programs.

The Local Development Works Programs, administered by the Planning Commission, was started to assist the local water schemes, with emphasis on local participation. The programs began, started in function in the year 1961.

The Technical Classes Welfare Programs, administered by the New Tuscany, confined its activities to the construction of simple open wells in rural areas predominantly inhabited by Scheduled Caste and Scheduled Tribes and other underprivileged communities.

The National water supply and sanitation programs was launched by the Government of India in the year 1974 as part of a Ninth Plan to help the State Governments to achieve better coordination in the field of urban and rural water supply and sanitation. This program is being implemented in the different states by various Public Health Engineering Departments and other agencies under the advice and guidance of the Central Public Health and Environmental Engineering Organization (CPHEE).

Although the programs were initiated in 1956, it could not take much headway because of the high priorities enjoyed by other sectors under irrigation, agriculture and habitation. While the country's opportunities advanced in other spheres, water supply and sanitation remained did not become their legitimate priority. The experience gained in the Fifth 5 or 1 Five Year Plan periods influenced the superintendence of many states to handle the programs on a comprehensive basis. The Central assistance under the plan was in the shape of a total loan to the State Governments which distributed funds on the local bodies partly on loan and partly in grants-in-aid provided by the State Governments. The State Governments had to submit the budgetization based on their capacity to repay loans as in any monetary contribution. Because of the system of priority allocation of funds from the center to the states, it was not possible for the State Governments to plan suitably in respect of maintaining of reservoir, procurement of water materials and equipment, so that there was considerable delay in the implementation of the projects in all states. This drawback has, however, been reduced considerably from the Third

This approach is not considered adequate by UNICEF and the Government.

Five period records of delineating sources of pollution as referred to the above Government in respect of a large category of 1975 water supply sources.

The targets set up some of the system for the Fifth Plan period are important.

In Tamil Nadu, there was an allocation of Rs 300 million. The target was to cover 5,000 villages. The criteria for selection of villages were (i) drought and secondary areas, (ii) backward areas. The target is before Pradesh was to cover 10,000 villages with 12,000 acres. The criteria for selection was the same as in Tamil Nadu. Special attention was paid to villages affected by scheduled caste and tribal areas. In Madhya Pradesh the target was 12,000 villages, in Maharashtra 12,000 villages, in Gujarat 7,000 and in Karnataka 10,000 villages. In Karnataka the criteria for selection of villages were:

1. No source villages
2. Villages with basic problem
3. Villages affected by acidity

In all these states, the concentration of the programs is for installation of hand-pumps as against the supply of point-sources for water supply.

According to the information available so far 90,000 problem villages have been covered all over the country. There are 20,000 other villages to which water supply has been provided.

It is expected that about 12,000 to 15,000 villages will be covered in 1980-81. An allocation of Rs 400 million has been made under what is termed as an accelerated programme of water supply. In this programme about 4,000 to 5,000 villages are to be covered. The previous need programme has already been completed. There is an allocation of Rs 300 million in this programme for providing drinking water. About 5,000 to 10,000 villages are expected to be covered under this programme. Even if the target is achieved in 1984 still there shall be one hundred thousand problem villages which will continue to have problems of people and potential water supply.

At the present rate of progress, it will take a decade or ten years to cover only the problem villages.

² People with very low socio-economic status. Their houses are usually located on the outskirts of the village.

ADMINISTRATIVE LEVEL

MINISTRY OF WORKS AND HOUSING, at National Level

Water supply and sanitation are state subjects and as such they are a responsibility of the State Government. At the Central Government level, the Ministry of Works and Housing has been assigned with full responsibility for providing water supply, sewerage and sanitation facilities in urban and rural areas. This is effective from the FIFTH Five Year Plan (1961), and the entire budget is controlled by that Ministry. This is a departure from the earlier practice, when other Ministries have the Ministry of Agriculture (Department of Community Development) and the Ministry of New Affairs had their own schemes for providing water supply in the rural areas, such as handpumps and gravity wells. However, the Works and Housing Ministry, at the time of framing Five year plans, created other ministries concerned in the field of rural water supply. The Ministry of Health has no direct responsibility for this programme at the central level.

The Ministry of Agriculture administers the programme for the utilization of wastes, both solid (garbage) and liquid (sewage), primarily with the object of assisting agricultural production. These programmes are also coordinated with similar activities of the Ministry of Works and Housing.

The Central Public Health and Environmental Engineering Directorate (CPHEED), which is attached to the Ministry of Works and Housing, manages the Water Supply and Sanitation Programme in the entire country, and coordinates its implementation by the state government agencies.

It looks after various aspects of the programme like planning, programming, technical scrutiny of schemes, guidance to the states in technical matters, liaison with the executing authorities in the states, monitoring and a follow up of the progress of the work. One of its main functions is to keep in touch with international and bilateral agencies to provide necessary assistance offered by them to the various states. This may include the provision of engineering hardware, supplies and equipment, supply of consultants, and fellowships offered by the Governmental agencies for training abroad.

Role of other Ministries

The Planning Commission, which is responsible for the overall development of the entire country, coordinates the proposals of all the ministries and finally approves the policies, programmes and allocations of funds to the different ministries for their programmes.

The Central Government Board, under the Ministry of Agriculture, includes the Ministry of groundwater engineering and exploitation. The Governmental Division of the Geological Survey of India, which also includes in this field is not attached to the Central Government Board.

The Department of Community Development in the Ministry of Agriculture, and the Department of Social Welfare in the Ministry of Education and Social Welfare are not directly concerned with the programme from the Fifth Plan. However, these two agencies are concerned with rural water supply as part of their task to ensure the overall development of the rural areas.

Recommendations

The National Committee (1961-62) had recommended the setting up of independent statutory boards with adequate power to plan and finance water supply. It had also suggested the setting up of independent Public Health Engineering Departments. The Irrigation Committee (1952-53) noted that there had been some improvement in the position with regard to independent Public Health Engineering Departments, where 1980 (about 17 states have such departments). As far as independent statutory boards are concerned, only two states Tamil Nadu and West Bengal have set them up. Orissa, Karnataka and Punjab have constituted boards for urban water supply, and a Board has also been set up in Maharashtra for providing loans for urban and rural water supply.

The organization in some of the states is described below.

State-level organizations

The burden of management and organization of urban and rural water supply and sanitation schemes rests primarily with the various state governments. They are helped often by several agencies, which derive from state or union. One of the two departments - Public Health, Public Health, Local Self Government, Irrigation or Panchayats - is generally in charge of the programme.

At least in 17 states have independent Public Health Engineering Departments or look after both urban and rural water supply. In the states of Andhra Pradesh and Gujarat, there are separate Public Health Engineering Departments for urban and rural water supply. In Tamil Nadu, there is an autonomous Board to look after the rural water supply programme. The Board in Tamil Nadu, is responsible for planning, and construction and maintenance. The community through the local bodies is expected to contribute to defray the maintenance expenses.

Various problems have been encountered in an effort to realize various policies on aspects of organization and management of the rural water supply schemes in the country both during construction and operation. The Director-General of the concerned departments in the states have been responsible in some extent for the high-level manner in which attention was being given for execution of water supply schemes. Importance of the fact shows that there should be one agency or organization in each state, preferably a rural board, which should be responsible for implementation of rural water supply schemes from the stage of design and planning to completion and operation. Guideline policies and procedures with regard to fixing priorities, selection of villages, design criteria to be adopted etc. could be evolved and adopted only when there is a uniform organization in the management side.

In Andhra Pradesh, the Rural Water Supply Programme is under the Panchayat Raj Department. In Gujarat it is under Panchayat Raj and Public Department. In Madhya Pradesh, the Public Health Engineering Department is in charge. The Rural Development Ministry is responsible for the Programme in Maharashtra. In Rajasthan, the authority is charge is the Public and Public Health Department. In Tamil Nadu, there is a statutory body under the Rural Development and Local Administrative Department.

The difference in the organization does not only relate to the Ministries or departments under which the Rural Water Supply Programme functions, but the structure of the organization itself is different. In Tamil Nadu, as indicated earlier, it is a statutory body with full financial powers. The decision regarding the programme implementation rests with T.N. Water Supply and Drainage Board. The Operational Officer can use his discretion to spend the drilling rigs in his jurisdiction. The Chief Engineer is in charge of the programme. Under him are many Superintending Engineers at field levels. There are Civil and Mechanical Engineers to help the S.Es. There is also a Geophysical Assistant who looks after the well sites.

In Andhra Pradesh, the Department is under the Panchayat Department. There is a Chief Engineer who is exclusively for implementing the developmental activities of the rural water. Policy decisions are made by the Chief Engineer. Within the District, the District Collector is responsible for indicating the priority areas. Allocation of funds and priority given to the Government. The Department also has a Geologist, a Geophysicist and a Hydrogeologist. There is only one Civil Engineer at the District level. All others at the District and at field levels are Mechanical Engineers.

The Public Health Engineering Department is responsible for the implementation and execution of the Rural Water Supply Schemes in Kerala Pradesh. The policy decisions are made at the Ministry or Government level, details of the programme are worked out by the Department once the policy is laid down. The Government Department can, however, make a request for releasing a department of logs - such a request is generally favoured.

The Chief Engineer and the Superintending Engineers are responsible to the Secretary of the Department of Public Health Engineering. In the P.W.D. there is an Executive Engineer at the district and a sub-engineer at the operational level. There are no civil engineers or persons trained in dealing in the set-up.

The Government Survey and Development Agency has been set up as an independent body in Maharashtra. The Planning is basically done at the district level and the SDA is involved in the decision making through the Executive Assistant Engineer. The decisions regarding the financial allocations are taken at the state level and the SDA has powers to implement and shift rigs once the budget allocation is made. The SDA has a structure. There are six divisions - survey, drilling, mechanical, administration, accounts and planning. The evaluation team set up by the Government of India in 1975 made the following points:

1. SDA is an executing body rather than a policy making body.
2. The allocation of villages by SDA Perishads interfere with long range planning.
3. The number of technical personnel, i.e., mechanical engineers, appears inadequate.

The Chief Engineer is also a Joint Secretary to the Department of Fisheries and Wildlife at the Headquarters level. There are Superintending Engineers at the divisional offices. Executive Engineers are at the district level. At the operational level are the Junior engineers and supervisors. There are Hydrogeologists at the district level.

There are two divisions in Karnataka - one in the north and one in the south (conservation of WRODF Digs is in the north division). The Executive Engineer is in charge at the divisional level. Under him are Assistant Engineers and Junior engineers at the rig level. The Administration and Accounts divisions are located at the divisional level. The policy decisions regarding financial allocations are decided by the State Planning Department. The Chief Engineer at the state Headquarters is in charge of both water and forest water supply.

In Rajasthan, two major departments are involved in the Rural Water Supply Programme. The Public Health Engineering Department is in overall charge of all water schemes. The Geology Department deals with the wells for rural water supply at the District level. The Public Health Engineering Department, while the Chief Engineer of PHED is located at Jaipur, the Chief Engineer of Rajasthan Government Department is at Jodhpur. At the Division and the District level are Executive Engineers, Assistant Engineers and Junior Geologists. At the field level, there is a drilling engineer. The Department has a survey and research wing for carrying out geophysical surveys. There is a Waterlog Development Authority consisting of Collector, Member of Legislative Assembly and other elected officials which handles the scheme to be taken up. The committee has felt that the planning and execution of the programme was rather difficult. There was need for a more integrated approach.

At the P.W. level, the set-up was similar to all the states with a Junior Engineer in charge. The other personnel consisted of Officers, assistant officers and helpers. There were necessary personnel for the execution.

The nature of organization is very varied. The basic need in the organization is to be able to take initiatives and to implement the programme by itself. In most states, the decision making is at the field and the implementation at another level of political departments. Both in Tamil Nadu and Maharashtra, there are Indian Air organizations. However, the experience differs. The personnel at the lower level tended to feel that they had no share in the planning process. At times, the planning could be effected by the Member Parliament. The National Water Supply committee has urged the setting up of standing bodies. The recommendation tends to be seriously considered if the programme is to be expanded. The Executive Committee has felt that the scheme should be presented to put the responsibility on a more political footing.

Coordination at the State

Madhya Pradesh had indicated coordination with the Geological Survey Department. In Madhya Pradesh it was noted that the Minister continued gave to the coordinating authority. The other departments connected to Madhya Pradesh are Panchayats, Social Welfare, Housing and Social Welfare. Some strong political Chief at the executive level Chief of wells and distribution of water schemes was there and for coordination.

² The UNDP and the UNRWA feel that an autonomous independent organization which covers all the aspects of water supply would be most desirable.

None of the states contained the need for working with the Health Department. In the ultimate analysis, the program is expected to give rise to better health conditions and therefore health departments need to be closely associated with the program. However, the Health Department has an organization reaching the village level.

The general impression gained is that the Department hopes to operate on initiation, if the program is to be part of the total process of development, general efforts for coordination with community development, Forestry, Agriculture, Health and Welfare Departments is called for.

Legal Services Involved

The Department of Irrigation and Soils in the States assists the engineering organizations in the implementation of the program, wherever necessary.

Legal Status of Systems

A Government Department in which authority has been vested under an executive order, has the legal status to implement the program, without any other authority essentially. However, autonomous boards derive their authority from Acts of the State Legislature.

An Act for the preservation of collection of water has been enacted by Parliament, but this is applicable only to the Union Territories and EP states, which have given their consent.

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|-----|------------------|
| 1. | Assam |
| 2. | Bihar |
| 3. | Gujarat |
| 4. | Haryana |
| 5. | Himachal Pradesh |
| 6. | Karnataka |
| 7. | Madhya Pradesh |
| 8. | Kerala |
| 9. | Madhya Pradesh |
| 10. | Rajasthan |
| 11. | Andhra Pradesh |
| 12. | Uttar Pradesh |
| 13. | Uttar Pradesh |
| 14. | West Bengal |

Financial Allocations under the First Four Plans

First, Second, Third Five Year Plans, 1951-1955 and Third Annual Plans 1955-1957

In the First Three Plans and the Third Annual Plans, rural water supply programmes were implemented under four programmes: (i) Community Development, (ii) Canal Development, (iii) Backward Area, Scheduled Caste and Scheduled Tribes, (iv) Regional Water Supply and Irrigation Programmes (RWSP). The last programme concentrated on pipes water supply schemes, while in the other three it was mostly canal with construction of bunding systems schemes. During this period a sum of Rs 3,126 million was spent under these four programmes supplying 20 million persons or 45% of total population with water in safe water. About 15,000 villages had been provided with piped water supply until April 1957, when the Fourth Plan commenced.

In the first two programmes, the Central Government contributed 50% of the cost as grant-in-aid, and the balance was borne by the beneficiaries, while in the third, the cost was shared equally by the Central and State Governments. Under the RWSP, 80% of the cost was met by the Central Government as grant, and the remainder was shared by the State Government and the beneficiaries.

A preliminary assessment during the Third Plan revealed that in about 70,000 villages there was no source of water within a distance of 1/2 km (1 mile), or the depth of the water table in the wells was more than 15 metres (50 ft.). Also there were another 42,000 villages, which were having problem areas related to water. The total population affected was nearly 110 million.

Fourth Five Year Plan 1955-1960

The outlay in the Fourth Five-Year Plan on rural water supply was initially about Rs 1,100 million. The accelerated rural water scheme, initiated by the Central Government in 1951 provided a further allocation of Rs 500 million and other centrally sponsored schemes such as the RWSP water supply programmes added another Rs 25 million making a total of Rs 1,600 million. The total expenditure was about Rs 1,600 million. Priority was given to the scarcity and problem villages.

By the end of Fourth Plan about 50 million of the rural population (30%) had access to safe water.

Fifth Five-Year Plan 1955-1960

No material allocation of Rs 5,000 million has been made

⁴ reduced to 3,000 million

to provide access to safe water to 100,000 peasants and urban villages, totaling at a population savings of 200,000 (20 million). The entire amount is to be spent under the Mexican Health Programme as specified above, under the administrative control of the Ministry of Health and Hygiene, to ensure proper utilization of funds. If the present trend is continued, only 10% of the rural population would be covered by the end of 1980, compared to 50% suggested as the required target by the World Health Assembly.

The allocation of rural water supply as a percentage of total plan outlay, has increased from 0.2% in the First Plan to 1.7% in the Fifth Plan. While the annual per capita expenditures on rural water supply as the rural population as a whole, has increased from Rs 1/- to Rs 1.40 from the Fourth Plan to the Fifth Plan, it has remained almost steady at Rs 1/- per capita for the urban population.

INTERNATIONAL FINANCING

To expedite the programme, a scheme known as the accelerated programme has been initiated. For the year 1977-78 a sum of Rs 600 million had been allocated. This is in addition to the allocation already made in the plan budget. For the current year 1978-79, the amount allocated is Rs 600 million. The same amount is to be granted each year for the next five years (i.e. until the end of XI Plan).

These amounts are 100% grant from the Centre to the States, specifically allocated for supplying pebble villages.

Materials and Equipment

Pipes and Pumps

The country is producing all the materials and equipment required for installing the hand pumps. These are available in sufficient quantities. Pipe sizes varying from 1" diameter to a maximum of 4" diameter are required for implementation and no difficulty has been experienced so far in procurement of such pipes. Other pipes such as asbestos cement, cast iron, PVC etc., are available in the country, but the production may have to be stepped up if local water supply schemes are considered on a large scale. As regards pumps and equipment, the capabilities and resources required are very moderate and there are many manufacturers in the country for such equipment. The pipes and pumps, therefore, do not

from any other ¹ for delivery programme?

During an earlier study it was found that the majority that were installed, broke down fairly frequently. In one instance, at a power trip, more than 20 per cent of the pumps were not functioning. The situation has changed substantially since then, many improvements are considered to develop a more sturdy design. The company that is now being used is glad that in the Indian heat pumps no more improvements have been suggested. It was pointed out, although discussion with the people in charge that their performance is quite good, the machines are much less efficient. The design has resulted that there has been no need for repairs over a long period.

Rigs

India manufacturers some drilling rigs. For the hard rock areas, the rock rig is not yet manufactured in India. Some parts are made here, others are imported, and the assembly is done in India.

There are now 161 rigs in operation all over the country in the rural water supply programme. Out of these 126 have been supplied by WHO. The Government estimates that 300 more rigs will be necessary to complete the programme i.e. to provide potable water to all the problem villages. The rigs are of different types to suit the needs of the varied terrain of the country. While there is need for acquiring more rigs, it is also necessary to make optimal use of the existing rigs. In the evaluation study referred to earlier, it was found that in some states, on an average, the rigs were not in operation for more than half the year. Clearly this was due to weather, partly to break-down and the delay in repairs, and partly to the time taken to move from one place to another. The budget was often insufficient to procure all the necessary inputs for optimal utilization. Some action has been taken to reduce the "idle days" of the rigs. Increasing the number of rigs employed, would mean that states would have to make a larger financial allocation so that the necessary inputs should be procured for the operation of the rigs.

¹ Notwithstanding the quality of production seems to be satisfactory. The India Heat Pumps Company is an private manufacturer by not large companies. The question is whether small scale industries are also kept up the quality to a comparable standard of private companies in the Indian Standards Institution.

Geophysical Instruments

A large number of states have various types of geophysical instruments. It has not been possible to collect the exact information. While all the states have magnetometers and resistivity meters, some loggers and seismic stations are only available in five states. The two loggers and the seismic stations are hardly ever used. The indications were that the magnetometer and the resistivity meter were used, but not sufficiently. These instruments can be used effectively by persons who have the necessary training in geophysics (India, Nepal, and Sri Lanka and Malaya) and are the only states that have geophysicists in the department. In Malaya, there is close co-operation with the Department of Geology and Mines. In Andhra Pradesh, the percentage of successful bore holes had increased as a result of the use of geophysical instruments.

Trucking

The position of the support vehicles for various operations is not fully adequate. The situation is better for the UNICEF-supplied rigs. The performance of the vehicles also reduced as complaints. Earlier, it had been mentioned that the use of operation of the vehicles (except pick-ups) was prohibited. There is now a policy of converting all the engines where diesel can be used.

Maintenance

One of the major problems that is faced by various states is with regard to the proper maintenance of the equipment. The problem has been rather varying, but there seems to be some breakthrough in a few states. In some states, such rigid water schemes and handpumps fitted in tubewells are being maintained by the State Public Health Engineering Department while in others they are being maintained by local self-government bodies. In practice, it has been found that the local bodies were not able to maintain the handpumps, due to shortage of funds and of persons who could carry out the repairs.

There is a central depot in Bombay for repairing rigs. While this is the main one, there are 2 other repair shops, in Hyderabad and Tiruchengode.

The policy to purchase has been and still is one of the major problems in making optimal use of the rigs. The situation has improved somewhat recently. UNICEF, which used to supply spare parts only for those rigs which it had provided, is now supplying imported parts for the rigs bought by the states also. The pressure by which states could get the parts was rather complicated. While there is progress, there is still plenty of scope for further rationalizing of the repair process.

Training and Recalling

With the progress in the development of rural and urban water supply systems over the past few decades, the need for trained and skilled personnel in various fields such as planning and design, construction, maintenance and management is also on the increase. Unfortunately, there is no branch of engineering education or sub-professional education in the country. There are 120 Engineering colleges and 200 polytechnics with an annual intake of about 25,000 for graduate courses and 25,000 for diploma courses respectively.

For facilitating training programmes for incentive personnel, the CPWD has evolved suitable training content to suit the different categories of engineers and auxiliary personnel employed in the profession. These training programmes have again laid emphasis on the needs of the situation attending the total problem, besides education amongst rural population, promotional work among local artisans and other problems relating to the efficient maintenance of the completed schemes.

The P.W.D. training was started as a Central Programme under the National Water Supply and Sanitation Programme in 1958. The objective was to impart training to all the fields of Public Works Engineering for in-service personnel and the training was provided with financial assistance from the Centre. Post-graduate Engineering courses are held at the All India Institute of Hygiene and Public Health, Calcutta, Post-Graduate Technical Institute, Bombay, Engineering College, Coimbatore, Madras, and Institute Technology, Kanpur. Other Pradesh, in addition, a three month certificate course in Public Works Engineering is being conducted for subordinate engineers at the College of Engineering, Coimbatore, Madras.

The CPWD also conducts several refresher courses of duration varying from one week to six weeks. The number of people trained in various courses is given in an annex *

(i)	Post Graduate Engineers	751
(ii)	Short-term courses for subordinates	
	Engineers	1,281
(iii)	Water Works Supervisors	250
(iv)	Well Builders	380
(v)	Water and Sewage Analysis	41
(vi)	Sanitary Works Engineers	25
(vii)	Distribution System Analysts	15
(viii)	Other Refresher courses	530
Total:		<u>3,473</u>

* Information supplied by CPWD

General Assistance

UNICEF

The UNICEF assistance was first made available to the rural water supply schemes in the year 1963. The aid from the UNICEF was in the shape of hardware, materials, equipment and transport provided to a total sum of about US \$100,000 for a five selected stages to carry a pilot project benefiting about 20,000 rural population in each area. The projects selected were intended to demonstrate the correct relation between the engineering and health aspects of the programme. The programme, however, suffered from following handicaps in its scope and content. It was realized a little later that the UNICEF assistance could have a greater impact and achieve its objective if the scope of assistance could be changed to one of providing drilling rigs which were not available in the country. Since then, UNICEF has supplied 14 drilling rigs to various states. In order to keep all these rigs in optimum condition the UNICEF has also supplied spare parts and consumables. In 1974, the Ministry of Works and Housing appointed an Engineer team to study and recommend measures to improve the utilization of rigs in the maximum extent possible. The team has recommended various measures to be started in respect of maintenance of rigs, maintenance of completed bore wells, handpumps etc.

India (Danish Government) has offered assistance of 10 MIAA million, through UNICEF, under UNICEF World Project assistance for providing water such as drilling up of specifications for the type of rigs required for borehole engines. Technical details for gravity feed systems in borehole engines are being prepared.

WHO

The WHO technical assistance has been made available to the National Water Supply and Sanitation Programme since 1963 to the extent deemed necessary by the Central and State Governments. Assistance in rural water supply was at first limited to advice and primary health centres, but was later expanded to include rural committees and, where feasible, groups of villages. Schemes of rural water supply systems and handpumps divided on two units have been implemented.

IDA

The International Bank for Reconstruction and Development and the Technical Development Association are implementing a US \$10,000,000 Rural Water Supply Development Project for the State of Bihar, India. The scheme will provide 600 rural water supplies - an average 1,000 villages with a population 400,000.

The table below gives the contribution made by various organizations and governments. All these funds are channelled through UNICEF. The amounts are generally used for materials and equipment.

<u>UNICEF</u>	<u>CONTRIBUTION £</u>
UNICEF	345,000
Indian govt	75,000
CIDA	251,500
CAF	11,500
NSG	1,200
UNICEF	1,400,000
UNEP/FAO (various)	1,800,500
	<hr/>
	3,813,700
	<hr/>

Rural Sanitation

Sanitary latrines

In the earlier plans, there was some concern for programmes of sanitation - but all projects this subject is hardly mentioned.

Rural sanitation was included as an integral part of the National Water Supply and Sanitation Programme under the 11th and second Five Year Plans. During the plan periods, about 2% of the cost (2% by the Central Government and 1% by the states) was paid in India for the construction of water-scarce latrines in their homes by some states, the remaining 1% of the cost which came in about the 10th - 12th latrines, was borne by the beneficiaries. The cost did not, however, include superstructure and this was met entirely by the beneficiaries. The present cost of such latrines, however, is between Rs 200/- and Rs 300/-. The programme however did not make much headway previously because it was pursued in isolation without a supporting programme of rural development as a whole. No reliable is available about the number of latrines constructed in the country. Only a few groups such as Grameen and Janak have provided data in the Fifth Plan for the construction of sanitary latrines in the rural areas.

The Research and Action Institutes at Meerut, Hyderabad, Chennai and Lucknow have set up pilot projects for the safe disposal of excreta in the rural areas and there would have been the need for further development of the programme in the country. Efficient design have been adopted in with local conditions.

In general, the rural people still practice the habit of open air defecation. The absence of basic sanitary facilities, both as the disposal of waste water, from houses and the safe disposal of excreta, has made conditions in villages very unsanitary.

The data are available for 1972-73 and 1973-74 regarding some aspects of sanitation. This is given in the table:

	1972-73	1973-74
Barrel latrines constructed	24,000	41,000
House drains constructed (meters)	1,791,000	1,361,400
Village house paved (sq.meters)	1,000,000	1,440,000
Seepage pits constructed	50,000	66,000

It may be of interest to note that neither in the Fifth Five nor in the Plan for 1977-81 there is any reference to the problem of sanitation. The matter was discussed with the officials. The feeling is that there is need for an educational programme for improving the sanitary conditions in the rural areas. It is also further felt that unless there are sanitation facilities provided, a sanitation programme by itself would have little meaning. The thinking on the official level seemed to be that the sanitation programme can be deferred until after one of the necessary prerequisites like safe water supply, medical facilities, etc. are available to the people.

Disposal of Waste

The problem of the disposal of waste has been aggravated where piped water supply has been introduced. Even in some urban areas, where handpump water supplies have been provided, serious problems of drainage are being faced. In some cases where piped water was supplied, the villagers made limited use of the system because of the unsanitary conditions created by waste water, which has also made village lanes impassable. The absence of proper drainage has also led to increase in the mosquito menace and possibly contributed to an increase in filariasis in endemic areas.

Urban Water Supply and Sanitation

Existing Situation

While the study deals primarily with rural areas, a glance at the urban situation would be useful. The urban population in India according to the census report of 1971 was 109.15 million distributed in 3,117 towns. Out of this, 1,686 towns have been provided with water supply covering in theory a total urban population approximately 80%. Most of the towns which have water supply systems are unduly in need of considerable improvements and expansion. Most of the provided water supply systems are deficient in respect of optimum standards of quality and quantity. Many of the towns comprise unimproved areas within the distribution system. Most of the metropolitan cities are also in need of augmentation of water supply.

One of the main reasons for the present status of urban water supply is the unbalanced development taking place in many of the urban towns and particularly the metropolitan areas. According to information available, about 1000 towns are yet to be provided with water supply facilities. It is expected that most of these towns have population of less than 50,000. It is roughly estimated that the cost of providing water supply in these towns yet to be covered would approximately amount of Rs 24,700 million.

In regard to sewerage facilities, about 211 towns have been provided with such facilities but most of these towns have been only partially covered. It is estimated that about 24 per cent of the urban population has been provided with sewerage system. Because of the low priority given to water supply and sewerage in Five Year Plans, the progress achieved with regard to these schemes is far from satisfactory. In order to provide sewerage and sewage treatment facilities, to about 700 towns with high priority, it is roughly estimated that the cost involved would be Rs 1,600 million. These towns include all the 50 towns situated in hygienic areas with filthbanks and also towns which are faced with major water pollution problems. The immediate requirements of urban schemes is, therefore, likely to be of the order of Rs 26,300 million.

Most of the towns have separate Public Health Engineering Organizations to deal with urban water supply and sewerage projects. The investigations, design, construction and maintenance phases of urban water supply and sewerage facilities are exclusively within the purview of these Engineering Organizations.

None of the urban schemes are being financed or plan-
sponsored and partly by loans received from the Life Insurance
Corporation, the Government of Madras, however, is very much in the
From the inception of the water supply and sanitation programme in
1946, hardly Rs 15,000 million have been spent on urban water and
sanitation schemes. The expenditure incurred is greatly inadequate
compared to the huge magnitude of the problem.

Water Supply

A study made in eleven areas of India highlighted the
inequality of water supply and sanitation in urban areas. It was
found that there was no potable water supply to 72% of the
settlements and in terms of population 66% were not served by
any potable water supply. It was suggested that the pressure
of water was low throughout the year and was extremely inadequate
in summer months. The average number of persons per tap was
72% in those settlements where water was available. If the entire
population of the settlements was taken, there would be 361 persons
per tap. Apart from the taps, handpumps had also been installed.
Out of 576 handpumps about 26% were not functioning. Nearly 60%
of the settlements did not have any handpumps. The water from the
handpumps is regarded by a great majority of inhabitants as unsafe.
Those suffering from diseases like diarrhoea, stomach ailments
and other water-borne diseases among the people in the cities were
estimated quite a high proportion.

The situation with regard to latrines in urban areas.
For a sample population of 50,000 which was studied, there were
only 142 latrine units, giving an average of 121 persons per
latrine unit. Most of the latrines are of the dry type. Even
those of the water-flush type pose a problem for their cleanliness
in the absence of adequate supply of water. The services of
the scavengers are not very regular. Because the facilities for
toilets are inadequate, they are covered by too many persons
and, in the absence of regular cleaning, most of them have not only
become unserviceable but also extremely unhygienic and dirty spots
in the settlements.

There are no drains in the urban settlements. There
exist only scattered covered drains which are laid along the
streets, lanes and by-lanes. Only about two-thirds of the houses

* "Drainage, Sanitation in India", V.A.P.D.,
Government of India, 1973

of settlements surveyed had drains. Even those the drainage was partial. Half one-third of the settlements have drains on later pits. Garbage and refuse are thrown into the drains on both on the streets. Less than one-half of the settlements has storm-cleaning and refuse disposal arrangements. Even in those settlements, there are few trash bins. The services of the city's are not regular.

It is also found that there were 3,442 animals, mostly cattle, in the settlements. These animals tended to aggravate unhealthful and unsanitary conditions. This may not be a very representative picture of the urban areas as a whole. The slum areas, in which about a third of the city population resides, do have serious problems with regard to water supply and environmental sanitation.

Drainage

Water Supply

The Extension Committee of Parliament in 1971/72 was concerned with the slow progress of the programme of water supply. By 1971, 22,000 problem-villages had been covered. The latest estimate is that about 40,000 problem-villages have been covered. It is reported that another 20,000 problem-villages would be covered in 1978/79. The progress in the last few years has been more rapid than in the earlier years. Most of this is due to greater expeditious, more financial allocations and more concerted efforts. The drought conditions which prevailed in some parts of the country during the last few years provided a further incentive to accelerate the rate of providing water supply to rural areas. In spite of this programme, still 100,000 villages remain to be covered. The sum required for providing water supply to all problem villages is Rs 270,000 millions.

Although there is an increase in the allocation of funds to the programme, it is obvious from the above figures that what has been provided has been inadequate. There is little scope for increasing the amount to any large extent. The allocation to a particular sector is dependent upon the total resources available for the plans. There is a great variation from state to state. Nevertheless, there is a clear indication that all the states are making serious efforts to accelerate the implementation of the programme. However, both financial and personnel resources are limited. In 1974/75, the amount available for the programme is about Rs 750 millions. Their requirement for completely providing water supply to all the problem-villages would be in the order of Rs 1,000 millions. Even if the funds were available the expenditure is not equipped to handle

with them about 800 villages. In Tamil Nadu, the previous villages have been classified into two types. Type one and two which were most severely affected covered about 1,500. The United Nations was helping to cover all these villages in the coming year. The allocation to Tamil Nadu is Rs 70 millions. Out of this Rs 60 millions will be spent on other water supply. The estimated cost for covering 1,500 villages is Rs 200 millions. Under the circumstances, it will not be possible to provide potable drinking water to all these villages in the coming years.

The information given by other delegates. There is no regular flow of information from the state to the centre. The study made in 1974, was concerned with the lack of proper information. Since then no information unit has been set up at the central level. Some of the states have also agreed to set-up similar cells. It is possible that when the cells begin to function, the flow of information would be better and more meaningful.

Earlier studies have pointed out that malnutrition was a serious problem. There is some improvement in this regard. The sanitation system being tried out in some of the states for reducing handpumps, the setting up of a Central Board in Bombay, the space given being supplied by WHO in the signs owned by the states, have all helped in improving the performance of the programme. The improved models of handpump have reduced the break-downs.

The situation with regard to the water supply is far from satisfactory. However, one can take a more optimistic view as the problems have been recognized. This is reflected in the desire to increase financial allocations, to streamline organization and to improve the maintenance of the equipment, all of which indicate the positive direction in which the programme is moving.

CONCLUSION

The situation with regard to sanitation is rather gloomy. A report prepared by WHO in 1974 pointed out that the world sanitary latrine programme was given up in most states after the Third Five. There has been no provision for this programme in most of the states since then. The disposal of sewage and sludge has not attracted much attention so far. The situation has not changed very much. There is still no indication of any serious work in the sanitation programme.

Bhagat is not alone to be less concerned over the sanitation. A study conducted about 10 years ago in one of states (State Financial

* Improved Change in Health Subsector
PLAN Publication No. 238, London 1988

stated "environmental sanitation does not have high priority in the minds of most people". There is lack of awareness of the relationship between the state of health of the people and the level of environmental sanitation in the community. The World Bank study also felt that the environmental sanitation measures, if promoted in isolation from other programs, would have reduced effectiveness.

The Health Ministry does not seem to have any specific programs for educating people with regard to environmental sanitation. In fact, as the CPHEO is in charge of both water and sanitation, the Ministry does not feel that it has any responsibility for the sanitation programs. The CPHEO's primary concern seems to be to provide drinking water to the people. The sanitation programs is hardly mentioned. It is certain that a greater effort could be made to improve the environmental sanitation.

1947 - 48
The Great Depression

Case Study 3

Tamil Nadu

Background Information

Tamil Nadu is the eleventh largest state in India. It is located in the southern part of India. The population of the state according to the 1971 census was 41.2 million. The projected population for 1976 is 47 million. The birth rate is 36.7 per thousand and death rate is 17.5. The population density is 317 persons per sq. km. Twenty per cent of the state's population reside in urban areas and the remaining 80 per cent live in villages. The literacy rate for the state is 29.9%.

The climate is tropical with temperatures varying from 40°F to 100°F and the average is about 85°F. Tamil Nadu receives rainwater from the southwest monsoon (June to September). Annual rainfall is around 140 cm per year. For the last four years Tamil Nadu has experienced drought conditions but in November 1977, it received heavy rainfall. Agriculture is the backbone of the state with 75% of the rural population engaged in agriculture and allied occupations. About 45% of the geographical area of the state (234,500 sq. km.) is under cultivation. The crops grown are rice, millets, sugarcane, groundnut, cotton, pulses etc. The per capita income for the state is Rs. 489. This is slightly higher than the all India figure. Twenty-eight percent of the towns and villages have been electrified. Nearly 50% of the ungrazed paddy soil in the country are distributed in Tamil Nadu.

Agriculture and Rural Development

The policy of the Tamil Nadu Government is to correct the regional imbalances in programmes, increase the income of the rural population by the provision of irrigation facilities for multiple cropping schemes, for the development of agriculture, animal husbandry, dairying and fisheries, employment opportunities in the non-agricultural sector, particularly for the landless labourers through the co-operatives and construction of roads, canals and other irrigation sources, soil conservation and afforestation, provision of fair price shops in small remote villages, provision of credit and marketing services to small farmers, fishermen and landless labourers. To extend the programmes for rural water supply, rural roads, schools, adult literacy, rural housing etc. There is also a proposal to set up district industrial centres in 7 districts for the promotion of industries.

Medical and Health Facilities

There are 115 primary health centres in the state. Besides the

primary health centres, there are 142 government hospitals. About 122 of them provide modern medicine. There are 1,333 dispensaries of which 458 are allopathic and 875 are indigenous medicines. The current population total is 2,240,000.

There were 2,280 cases of cholera in 1974 with 149 deaths. In 1975 there were 2,158 cases with 51 deaths. The numbers came down to 110 with 47 deaths in 1976. In 1977 the number of cases reported was 2,174 with 58 deaths. The other prevalent diseases are - gastroenteritis, hookworm infestation, diarrhoea, dysentery and typhoid. A study conducted in one of the blocks showed an infection rate of 42% among pre-school age children for all possible infections.

Another study conducted among the village population indicated an infection rate of 44% for hookworm and 50% for dysentery.

Water Supply and Sewerage

Until 1961, the water supply scheme was extended to by water agencies - Bombay, Bombay Development, New Bombay, Maharashtra, etc. In 1961, all the rural water supply schemes were handed over to panchayat unions². The provision of water supply for the socially backward areas came up with the Ministry Welfare Department. The implementing agencies were the highways and rural works departments while the responsibility was left to the local bodies concerned. The agency in charge for rural and urban water supply is the Tamil Nadu Water Supply and Sewerage Board which was constituted in 1970 as described later.

Rural Water Supply

In 1945, water supply schemes had been extended to 47 towns with the construction of a water supply and sewerage treatment, a planned programme for water supply was developed. The current objective of the Tamil Nadu Government is to serve all the local bodies with a population of over five thousand with protected water supply schemes which connect piped water throughout the year.

Out of the 74 urban water supply units in Tamil Nadu, water supply schemes in 24 units are either in operation or underway. Water supply is under in the remaining 50 units out of which 18 units investigations are in progress, covering a population of 5 million. The schemes were for providing water supply is estimated at Rs. 574 million. The schemes are financed by the local bodies through the water supply and sewerage board and loans are given by the Government when this needed. The 15th percentage contribution also makes loans, not directly to the local bodies but through the Tamil Nadu Water Supply and Sewerage Board. About Rs. 125 million has been loaned by the G.O.

²Panchayats below are local self-government bodies operating in 4 blocks - blocks are administrative units for Community Development covering a population of 60,000 to 100,000.

Water Supply

The main sources of water for the urban areas are the sub-surface water drawn from infiltration galleries and wells. This is the cheapest source of water since it does not require any treatment or cost of transport before it is supplied to the community. The supply of water to the community is through a distribution system network with mainlines and public taps in addition to the provision for house connections. Generally, the scheme is designed for a projected population at the end of 50 years. The per capita supply may range from 40 lpd to 200 lpd depending upon the site and the population at the time.

Rural Water Supply

According to the survey conducted in 1976, 4 PM villages did not have any water sources, 1 PM village depended upon protected sources and 11 PM villages suffered from inadequate water supply. The total number of villages covered by the end of 1977 was 9 villages.

For future planning the villages have been categorized into 4 types from Table II. While preparing the estimates indicated in the table, the following norms were adopted together with the existing facilities in the villages:

- | | |
|---|---|
| a) For habitations with population of less than 500 | One borewell with handpump |
| b) For habitations with population of 500 to 750 | Two borewells with handpumps |
| c) For habitations with population of 750 to 1,000 | One borewell with power-pump and ground level reservoir |
| d) For habitations with population of more than 1,000 | One borewell with power-pump and overhead tank. |

If the source is surface the habitation, a bore-well with a power pump has to be provided irrespective of the population. The total amount required to cover all the 25,000 habitations will be Rs. 740 millions. Due to paucity of funds, priority will be given to type 1 and 2 habitations. Habitations with no source and habitations with unserviceable water are ignored.

TABLE 1. CHARACTERISTICS OF VILLAGES, PREPARED AND ESTIMATION OF COST

Character Description	Definition	Age of habitations	Amount prepared for providing water supply for inhabitants	Population in the habitation
Type 1	Habitations where no more water has been prepared	1-500	70,000	8 000-400
Type 2	Habitations where the present grade only is acceptable water	2-100	40,000	400-800
Type 3	Habitations where water is provided but cannot be used presently	6-400	100,000	2 400-500
Type 4	Habitations where water is provided and provided but the water is either presently used or being used	6-700	100,000	2 500-600
Type 5	Habitations where there is no good water within the habitation but an alternative good source is available within 1 km.	1-700	50,000	800-900
Type 6	Habitations where there is a good water available	10-500	700,000	27 000-100
		20 000	600,000	20 000-500

Source: World Bank, World Bank & Engineering Board 1974-1976

The expenditure expenditure on this account will be Rs. 100 million. The budget allocated for 2002-03 is Rs. 100 million. The Government will make such funds and provisions of central government under the maintenance of water supply system.

The plan is to provide protected potable and processed water supply to the type 1 and 2 habitations below the size of 20000.

For habitations of more than 100 people the approach is to provide three habitations with a township. The population between 100 and 1,000 is provided with water capacity for 5,000 liters and a township is to be established. This is provided between 1,000 to 1,000 as a township with 10,000 liters capacity and for a township. For above 5,000 as a township with 10,000 liters capacity is suggested. At all the townships, the performance of the work is to be found to be most satisfactory. The approximate cost of the pump is Rs. 1,000.

For the maintenance of the townships, a three-tier system is suggested by UNDP has been decided. The system consists of (1) the smallest regional mechanical, such as water supply consisting of the district and a township with a primary vehicle, (2) district, and for every 100 people or 1000 liter and (3) township or village level.

An integrated system from each village is selected and is given a two-tier structure looking at the need and importance of water and the extension of the operation of water supply and township. It is intended to extend to about 1000 and supplied with village level. The location of the township area:

- (1) according to water supply to the township,
- (2) according to the community about protected water supply,
- (3) giving information on the basic level of water and drinking water from wherever there is a township in the township.

The three tier system of maintaining the townships is working effectively, consistently reducing the number of townships and of water. The scheme is in extension to various districts. (1) In order to extend the scheme to the various states, the World Bank Water Supply and Sewerage Board is considering whether the national townships to be established by the Ministry have should be reduced to less than 1,000. There are about 10,000 townships in the country, which are not today maintained by the national level body. Approximate cost of such a pump is Rs. 10,000. The average maintenance charges incurred in Rs. 100

per month. The total expenditures change including establishments, cost of services, etc. for the seven-year cycle are about 12, 1-1 million per annum.

Administrative System

There is a Council of Ministers headed by the Chief Minister who is a political executive. The highest policy making body is the Cabinet headed by the Chief Minister. Each minister is in charge of one or more departments. Each department has a secretary in the Government who is the administrative head assisted by a technical executive. There are numerous corporations and enterprises (e.g. the Tamil Nadu Milk Producers' Union, the Tamil Nadu Water Supply and Sewerage Board, etc. There is also a Planning Commission at the State level on the lines of the National Planning Commission whose major function is to prepare development plans for the state.

The state is divided into 18 districts, each of which is under a District Collector. For health development purposes the state is divided into 18 Development Districts and 154 MCDs. They are named according to the village panchayat (municipality) in the smallest unit of local government. With regard to health, there is a township medical officer at the district level. He has a number of other officers (physicians, nurses, sanitary health and family welfare, etc.), as already mentioned at the block level, there is one Primary Health Centre which caters to a population of 10 to 15 thousand. There are two centres and one sub-centred units. The Primary Health Centre is responsible for medical care, control of communicable diseases, environmental sanitation, school health and nutrition, maternal health services and family planning. The role of the Primary Health Centre in water supply and sanitation consists of:-

- conducting periodical health and sanitary services for populations at planning level for planning water programs,
- providing consultancy services to panchayats for the disposal of liquid and solid wastes,
- disseminating water courses regularly during festivals, programmes, etc,
- collecting and sending water for analysis, inspection of supplies and attendance registers,
- health education

Organizations for Water Supply

The Government of Tamil Nadu constituted the Tamil Nadu Water Supply and Sewerage Board in 1971. It is an autonomous body. It is

year for the conversion of the surplus type of latrine into the Flush-out type. Between 1970 and 1978 about nine thousand surplus type latrines have been converted into Flush-type ones. In the opinion of the Ministry, one school per block is provided with water supply and sanitary facilities.

A pilot health project prepared a scheme for provision of sanitary latrines and sanitary latrines in all the suburbs in a block. The cost of the latrines was Rs 4,000 and of the two year service was Rs 250. The scheme was prepared by the Institute undertaking the present study.

The Survey Area

Block Area

In continued section, 120 people were interviewed by one of the blocks. The block is well connected by a network of main roads to nearby important places. There are 17 villages including two townships and 12 village panchayats including 114 hamlets. The total population at the 1971 census is 221,287. The total area available for cultivation is about 46,000 acres. About 11,000 acres are irrigated.

There is a primary health centre with three subject officers, one for general purposes, one for family planning and the third for integrated child development scheme. They are visited by Health Inspectors and one Health Assistant who are in charge of the maintenance of general sanitation, vaccination and control of epidemics.

All the 120 hamlets are fed by one water source at one time. Most of the hamlets have more than one source. There are 120 tap-stands, 120 bore-stands. Of the 120 bore-stands, 70 were recently created under the drought relief work. There are 10 municipal tanks and 5 ground level reservoirs in this area.

General sanitation is the responsibility of the sanitary inspector of the concerned block. The scheme for converting the surplus type of latrines into Flush-type is in operation in this block. Two-hundred and fifty-one latrines have been converted.

Apex from this, the Institute which conducted the study has helped to construct 120 latrines in the area.

Only a segment of the houses in the blocks are provided with open drainage facilities. The houses across the area are advised to dispose of their sewage water through latrine gardens.

of 1968-1970. Four hundred and fifty participants have been incorporated in the areas. There also are 100 families with 1000 of the Institute which are conducting the study.

There are 4 high schools, 16 higher elementary schools and 12 elementary schools. Besides this, there are 16 Special Education Centers and 16 Basic Rural Centers. There are 12 centers under the Integrated Child Development Scheme. The main object of this system is to provide a package of services such as supplementary nutrition, immunization, health checkup, parental guidance, health and vocational education and non-formal education to an integrated manner to pre-school children, unprivileged and working mothers. Children's feeding programmes are available. About 15,000 children are being benefited by this programme.

Health Data

An excellent earlier, 10 villages were selected and 100 respondents were interviewed. The table (Annex I) gives information of the population, the type of water sources and methods of water supply. All the villages are well-served by road. One of them are completely occupied by Muslims, while the others by mixed groups. All the villages are electrified. The respondents consisted of 28 scheduled caste, 181 Hindu and 16 Christian. After half the respondents were Muslims. About 12% had more than five years of schooling.

Drinking Water Supply

Of the ten villages studied, eight have access to protected supplies. In 1968-69 only 4 of them wells (about 19%). In ten villages, people have no access to protected water and they use only open wells.

Thirty-seven per cent of the respondents take water from open hand-pumps, 18% from bore-wells and 1.1% from infiltration wells and 1.1% from stream and 1% from spring sources. There is slight variation between villages and season as some of the drinking pit dried up in summer. A larger percentage of scheduled caste villages have wells (20%) as compared to non-scheduled castes. This is mainly because of their earlier access to bore-wells. While 4% said that they boiled water before drinking, another 16 reported that they filtered water before drinking. The reasons given for filtering and boiling water "water contains dirt", "unwashed water causes diseases" etc. The sources of not drinking water are "poor water is scarce", "water is dirty and no disease is caused by consuming raw water". It will be seen here that the knowledge of polluted water

Figure 1 illustrates the methodology, from the initial concept and design of the project, through to implementation, and the final evaluation and reporting.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
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morning diarrhea is not very high. Of the 1,000 residents in the sample, 171 had some sickness during the previous six months, including 55 cases of fever, six cases of diarrhoea and dysentery, 5 cases of malaria, 10 cases of cholera, 47 measles and the remaining 39 other diseases. Only 3 per cent of the respondents always collect garbage from their pits and 4.75 through letting into the drains and the remaining 92 following water when it runs to the street. Only about 15.5 per cent are satisfied by the house. Fifty per cent were willing to have latrines inside their houses regardless of the view of the house, while 44.5 of men expressed their willingness, the percentage among women was 70. About half of the respondents built latrines inside their houses. Only 12 of the respondents said that flies breed in latrines. Only about 24 reported that flies spread diseases. Thirty-seven per cent considered them a nuisance while 12.5 said that they smell in latrine.

In a question asked about breeding places of mosquitoes, 70 reported that their house is stagnant water, twenty per cent said in drains, 24 participants while 10 did not know. About 40 per cent among those who had more than 3 years of schooling said that breeding is in stagnant water whereas 22 among the illiterates give the same answer. Eighty per cent of the respondents reported that mosquitoes were a nuisance. Only about 20 said that mosquitoes spread diseases.

Water

While 14 per cent of the urban population have protected drinking water, about 41 per cent of the rural area in the north are without such supply. In 1955-57, 45 million were spent on urban water supply and 45 million on rural water supply. The Government aims at providing water supply to all the urban and rural areas for 47.5 million and 45 million respectively. The South State Water Supply and Sewerage Board contributed in 1971 to approximately the planning and providing water supply and drainage schemes to rural and urban areas. For rural water supply, funds are allocated by the State Government in the form of grant. 47.5 per cent is given to urban water supply scheme and drainage scheme. The concerned local bodies are expected to finance about one-fifth. A committee's scheme has been formulated for the improvement of drainage. A survey was conducted in one district and the scheme expected to be very effective.

The general impression on the basis of this study is that there is little relation between water supply and environmental sanitation and health status in a community. The Primary Health Centre and other health institutions are expected to be educating the public with regard to various aspects of health. The study shows

that the knowledge among the public with regard to the causes of diseases and the impact of polluted water on health is poor.

There is very little concern for sanitation. The Government also does not seem to have a concerted program for educating the community with regard to sanitation. The immediate concern is for providing people drinking water in the ponds. This is viewed as a basic necessity that needs to be supplied universally.

There is no program to educate the rural people with regard to the care the people have to take to maintain good health. The existing practices are unsatisfactory. The labor-intensive sector has not allowed for a rigorous program to be followed with regard to the primary health care. A policy by the state has to be adopted to have a more integrated approach to health, water supply and sanitation. This would include aspects of primary health care. The Community Health Worker and the Curator who are not part of the infrastructure should be able to help in accomplishing this objective.

Rajasthan

Rajasthan

A study was undertaken by the Social Science Research Centre of the Rajasthan University to look at the rural water supply and sanitation programmes in Rajasthan. The study at the national level was assigned to the IIR which, in turn, requested the Rajasthan University to conduct the study for the State of Rajasthan. The study looked at the water-supply and sanitation programmes in the State in general and also collected detailed data with regard to the same aspects in 13 villages of three districts.

Background Information

Rajasthan is the second largest State. While it occupies 33.4% per cent of the total area of the country, it contains only about 3 per cent of India's total population. The present population of Rajasthan is about 29.8 million. There is wide variation in the density of population in the State which consists of large areas of desert, rocky mountain areas, and fertile plains. About 14 per cent of the population reside in urban areas. The rural population (86%) live in 10,715 villages out of which 12,300 are scheduled. About 80% of the total population of the State live in villages having a population of less than 500 persons. The average size of the household is 4.38 persons. The total population of the scheduled caste is about 14 per cent in the State. There is also scheduled tribes population of about 11 per cent. The tribal population is concentrated in a few districts only and their percentage ranges from about 40 per cent to 70 per cent in these districts.

The rate of literacy is rather low in Rajasthan, the overall rate in the rural areas being 14 per cent - among males 21 and among females 6 per cent. While in 1951/52 only about 50 per cent of the students of age-group 4-11 went to school, in 1973-74 it was about 90 per cent. Only about 1 per cent of the boys and girls of the age-group 14-19 went to school in 1951-52, but in 1973-74 it was 20 per cent. The number of primary schools in 1973 was 21,501, middle schools 4,409, higher secondary schools 1,387 and colleges 70.

The population of the State is divided into 14.3% per cent urban and 85.6% per cent non-urban. The male population of the State is divided into 21 per cent workers and 40 per cent non-workers. The proportion of non-workers in respect of the female population is 51 per cent and only 8 per cent are designated as workers. Agriculture is the mainstay of the people in the State, more than 70 per cent of the male working population and 81 per cent of the female working

population was engaged in this work. The net area sown in leguminous is 42 per cent of the total area. There has been a rapid extension of the area sown as it was only 26 per cent in 1942, or a 16 per cent of the total cropped area in water irrigations. The main source of irrigation in Rajasthan is tubewells, which account for irrigating 46 per cent of the total irrigated area. The second important source is canals, which account for 27 per cent.

Canals were in very poor condition in most districts. The only source of unimproved water, the Groundwater, has not been harnessed in any district and increasing the area for unimproved water resources. The water in the well was in very small quantities. Only 10 per cent of it is fresh water.

Only 17 per cent of the villages have electricity. While there is a good demand for electricity, it is in very short supply.

Medical facilities are available in the towns and cities. In the rural areas the attention is being concentrated. For the town as a whole, the demographic index is 1,700. In all towns, it is 1,400. There are only 11 primary health centres. This is less than half the required number, as the norm for a 100 is a population of 10,000. There are very persons practicing indigenous medicine. The exact information regarding their number is lacking.

The water supply facilities and programs

The problem of drinking water in Rajasthan, both in urban and rural areas, has been very acute. At the time of independence piped water supply was available in only five major cities of Rajasthan. By the end of September, 1957, water supply to all the urban areas, including 137, has been made. In the villages only 1,400 out of the 10,000 have been supplied with piped supply which benefits about 4.7 million people. The Rajasthan villages located in different areas are to be treated differently. In the desert areas, there are 8,000 villages of which 4,175 have piped water available for human consumption. In another 300 villages, the water is available but because of no consumption source people do not use for drinking. Only 3,000 villages (32 per cent) in this area have been provided with water which sources for drinking purposes. In the arid and semi-arid regions, there are 11,000 villages. The major portion in this area is in Rajasthan. Rajasthan, which is found in 1,000 villages. There is source of electricity in 1,000 villages and piped water in 1,000 villages, and handpumps water in 300 villages. In all, only 1,400 villages have been provided with satisfactory schemes.

In the above regions the problem of excess fluoride is more serious. From, out of the 12,708 villages, 1,940 villages have a no problem, only 46 villages have been exempted on this score, although the amount of fluoride in them is less. It has a considerable effect and needs careful determination on the basis. The bromide water problem is also there.

Classification of Villages

A preliminary survey was conducted and water samples from all the villages were collected and analyzed. On the basis of this analysis the villages were classified as under:-

1. No excess and bromide water villages.
2. Excess affected villages
3. Fluoride affected villages
4. Bromide and fluoride villages
5. No problem villages
6. Villages as above

Further approach to categorize the village is given in the table below.

CATEGORY	Brief Description	Number of Villages
No excess village	Villages having no potential source of water	1,120
Bromide 1	Villages where groundwater has pH more than 10.0 ppm of chlorides more than 1000 ppm	1,100
Fluoride affected villages	Villages where groundwater main fluorine has exceeded	1,000
Excessive fluoride affected villages	Having fluoride more than 1.5 ppm	1,971
Bromide II	High bromine (100 to 1000 ppm) or chlorides (50 to 1000 ppm)	1,324
Bromide and fluoride villages	Groundwater more than 15 mg/litre deep or hardening little more than 100 mg/litre	1,100
No problem villages		9,800
Total		11,015

India is one of the most afflicted countries in the as polution is concerned. It is estimated that 3 million tonnes of effluents are discharged into the Ganges and its tributaries. The sources of pollution are numerous in the metropolitan areas and in the rural areas. A survey of the highly polluted and diseased rivers shows that 50% of the rural population have suffered from this disease at least once in their life. On an average the pollution of groundwater has doubled in each of the states. The average loss per year is estimated to be about Rs 11 million.

A sum of Rs 100 million has been spent by the Government of India in providing drinking water in the State up to 1954-55 when the First Five Year Plan was in force. Of this, Rs 100 million were spent in urban areas and the remaining 100 million in rural areas. The State Government has indicated that in order to make the drinking water available for the remaining population, the financial requirements would be nearly Rs 1,000 million in ten years. In the Fifth Five Year Plan, the Government envisages to spend Rs 75 million in developing water supply in villages where there is no source of drinking water. It is proposed to cover 11,115 more villages under the Rural Water Supply Scheme in the Fifth Plan. However, the World Bank has agreed to make a loan for water supply schemes in rural areas. In the year 1968-69, the Central Government gave a loan of Rs 20 million for this purpose.

Sanitation

It is well-known that good water supply by itself without proper sanitary facilities cannot have the desired effect on health. A study carried out by the Capital City of the State revealed that inadequate sanitation is causing a loss of Rs 10 million in terms of labour lost and about Rs 20 million in medical treatment each year. Lack of financial resources is the major constraint in providing sanitary facilities. However, the State is just beginning to solve the problem of urban sanitation. The amount required for all the towns is estimated to be Rs 1,000 million. During the Fifth Plan period (1971-76) drainage schemes for six towns were taken up. Two of these, however, are likely to spill over to the Sixth Plan. The problem has only been dealt with in urban areas. As much as 11,000 tons of solid waste is thrown away in the rural areas.

The Administrative Structure

At the state level, the Chief Minister with Ministers is charged with various responsibilities. There is a Secretary belonging to the Administrative Services in charge of each of these departments. At the Division level, a Divisional Engineer is in charge. There are other Divisional officers in charge of various functions.

In 1959, an act was passed establishing Rural Self Development Societies, this provided in the District level and Panchayat Service in the Block level. The village level also has an elected body called the panchayat. Several panchayat meetings and DSS National Seminars have been conducted and the Government has been keen on the village level work under this service. The developmental activities for the DSS, water are being conducted through the panchayat, Government.

Organization of Water Supply

The authority to provide water supply is vested in, as well as local water works with the Public Works Engineering Department. This Department has an organization extending to the district level. It has two important sections - one deals with the construction and the other is the construction and design wing. The research and design wing has prepared its master plan for every district indicating the sources of the supplies, the chemical treatment of available water and possible for controlling difficulties. There is a Government Department which controls sources in the hydrogeological conditions of the various areas. It also undertakes testing of streams, on its own behalf or on behalf of the Public Works Engineering Department. The Department spends 5,000 wells for irrigation and the water for drinking water up to December 1959.

One of the drawbacks of the PWS set-up is that the organization is only up to the District level while the rest of operation and maintenance remains up to the village level. There is also a serious problem in the maintenance of pumping sets in some through contractors and not by the Department. Although the contractors are supposed to be responsible for the smooth working of the installations they have not been found to honour their aspect of their contracts. Villagers find themselves helpless when their pumping sets are faulty. They have to report through their panchayats to the District collector and through the District office to the PWS. This cumbersome procedure delays the urgent job of maintaining and repairing.

Name of Villages

Thirteen villages in these Districts were surveyed. The panchayat office in each village is one of the District Survey. In one district the villages were less than 10 km from the Railway station while in another villages were less than 10 km. None of the villages in one district had electricity, and even of the villages in the other one District did not have any electricity.

The population varies from 750 to 2,000. Only in one village there were no other communities. In the other villages their population ranged from eight to about nine hundred. Spoons in one village 150 originally were important in agriculture for their livelihood. Four villages did not have any schools. Of the remaining, four had primary schools, seven had middle schools and three had high schools.

Water Supply

Out of the 11 villages, three were classified as 'no water villages', although one of them had no water supply. Of the five villages which were classified as 'having access of昌里', three had no water supply. Four of the villages were classified as 'primarily without villages', but only two of them had water supply. In one village, the water was supplied through a canal which was considered a polluted source.

The total number of respondents in the villages was 121. Fifty per cent of the people interviewed get water from dug-wells, whereas about 50 per cent get it from an overground well, and five per cent from a handpump. About 80 per cent get water through taps. About 70 per cent of the people said the main source of water for all purposes (drinking, bathing, washing, etc.). Ninety per cent of the people had their water sources within the house while about 4 per cent had to go beyond 500 meters to get water. About 10 per cent had to go less than 500 meters, 30 per cent between 500 to 1000 meters, and about 7 per cent between 1000 to 5000 meters. Fifteen per cent spent less than ten minutes for getting water, 40 per cent between 10-20 minutes, 20 per cent between 20-30 minutes, and 10 per cent between 30 hours to ten hours. Those who had water taps in their houses had to pay Rs 4 per month for the water supply to their households. The others did not have to spend any money for getting water. When the respondents were asked as to the reasons for using a particular source of water, 110 respondents (90%) said that they used the particular source because it was near to their house, while 10 stated because the water from that source was sweet, six said it was good for health and 11 said that there was no other source available.

None of the respondents boiled water. When asked for the reason, 87 (72.7%) said that it was never done before, 16 (13%) said that boiling made water tasteless, 20 (16%) said that water from the well was from and there was no need to boil it. About 1 per cent mentioned poverty as a reason for not boiling. The general impression gathered by the respondents was that, except in the government-affected areas, people had no particular knowledge about the relationship between water supply and their health.

Health and Environment

In one village, one primary health centre was functioning. Two other villages were directly under the purview of the District Hospital from the District Headquarters. One village has an Ayurvedic dispensary which is another the villagers were constituted a minority centre out of their own cognitions. Of the 124 respondents, 18 said that there was a primary health centre in the village. When asked about the frequency of visits by doctors, 51 (about 40%) said that they never came, while 40 per cent said that they rarely come, - per cent said that they come twice or thrice a week, 1 per cent came a week and about 11 per cent came a fortnight. In the case of ordinary diseases, 19 per cent went to the Ayurvedic hospital, 20 per cent to the Government All-India hospital, about 11 per cent to the Primary Health Centre, and the remainder went for private treatment. In the case of serious sickness, 44 per cent went to the Government All-India hospital, 23 per cent to the Primary Health Centre, 18 per cent to private treatment and only 4 per cent to the Government Ayurvedic hospital. About 30 per cent of the people had no diseases during the last six months. For the others, all the villages reported having cases of malaria, eye, of gonorrhea, throat, of boils and sores, and one, all diseases. Twenty-two per cent of the people had spent more than Rs 200/- for the treatment during the previous six months, 42 per cent had spent less than Rs 50, 11 per cent between Rs 51-100, and 14 per cent between Rs 101-500.

The feeling that the respondents got was that people were willing to spend money for treatment. The most frequent treatment was injections. They seemed to have more faith in treatment through injections. In a majority of the cases, less than a fortnight was laid out in illness.

The respondents were asked to specify the diseases which were caused because of the type of water they consumed, and the disease caused by lack of sanitary conditions. In the questionnaire infected areas, people mentioned drinking water as the cause of the disease. However, it is interesting to note that 21 per cent said that they did not feel that there was any relationship between drinking water and diseases. As far as sanitary conditions are concerned, about 48 per cent said that malaria was caused by lack of sanitary conditions. Six respondents said that typhoid was caused by insanitary conditions, whereas 14 patients said that cholera was caused by the same. About 42 per cent said that they had no knowledge of any diseases being caused by insanitary conditions. The husband and wife (1971) people said that mosquitoes caused malaria and 44 (22%) said that they caused boils. 21 said that they caused sores, and six said they disturbed their sleep. The villagers were concerned about the lack of drainage systems, which allowed the mosquitoes to breed. There was lack of coordination between the Public Health Engineering Department and the Department of Health. Some villagers said that

supplies and tops should be provided only in those places where continuously drainage facilities with rice systems. The Frenchmen are supposed to be in charge of the drainage system, but the village people said that neither the Frenchmen had enough funds nor was the Government leadership under pressure to improve the drainage conditions. There was much pressure pressure on the Frenchmen to build tops. Even when the last pump had been installed, in the absence of proper drainage, water got stagnated in wetter parts and mosquitoes bred. It is possible that the health workers whom which has been criticized might provide the needed health education to make the villagers conscious of the need for maintaining sanitary conditions and to show how the village people themselves could do so. The present approach of the villagers is to depend on the Government for providing that need is to come in the village.

In groups the members of the health personnel in village level, while about half said that they did breeding, another half said that they sprayed medicines on water ponds and DDT in houses. About 45 per cent said that they were unable to kill the mosquitoes, while about 12 per cent said that they used DDT. Mosquitoes breed and DDT. The remaining about 40 per cent said that they did nothing to kill the mosquitoes.

The respondents were asked to identify places of breeding for the flies. Most of them said that they generally found in dirty places. A number of them said that they found in flats before the harvesting season. About 25 per cent did not know where the flies bred. A large number of the respondents are aware of the four types of flies, such as spreading diseases like cholera and causing other infections. About 5 per cent said that they avoided to touch and about 14 per cent did not know. Almost all the villagers said that the health officials did nothing to eliminate the flies. A few said that the villagers were advised to keep their houses and surroundings clean. Some said that they burned garbage at special times. The respondents felt that cleaning of houses, covering of garbage, spreading of lime are done by health officials only if they come to look of an impending danger of a cholera epidemic. The Public Sanitation Department seems to be more active. About 65 per cent said that they tried to keep the houses clean, while another 9 per cent said that they sprayed DDT in their houses. When the respondents were asked to suggest ways and means to fight the menace of mosquitoes and flies, most of them said that the Government should spray DDT, and a few said that they should keep their villages and houses clean, do mosquito control, and destruction on the Government and the effectiveness of the village came through in this question also.

Only 12 persons had latrines in their houses. It is not only for the people to have a latrine in their houses as the layout of their houses does not provide for constructing a latrine. Most of the houses are mud houses. However, however, there is hardly any provision

for proper support of a flush system in the villages. Some of the big villages have some septicage, people have to walk between one hundred to three hundred meters to the edge of latrine. When asked as to whether they would like to have latrines in their houses, 128 replied in the affirmative, while 129 said 'they would not'. It seems that the bigger villages, villages which are comparatively nearer city and villages which have some connections appear to be in favour of latrines inside the house. It was also to be mentioned here that the upper caste people in this area observe Purdah and some may have said 'yes' for having latrines because of this. Of those who had replied in the affirmative, a question was asked as to why they did not have a latrine at all. Many of them said that they had no money, it 'was place', it 'was adequate cleaning arrangement', and it 'never thought about it'. It might be mentioned here that a latrine type latrine' called the Bangla type has been developed and it could be constructed for less than Rs 200-00. People in only three villages were aware of this type of latrine. There seems to be no provision for demonstration of latrines in any of the villages. The health officials said that this task was assigned to the Development and as such they did not take any action. About 40 per cent said no objection to have public latrines in the villages. Some 117 per cent had constructed because of the problem of cleaning.

The respondents were asked about the drainage system inside the village. Only a few individuals have proper arrangements for drainage, after directing the water to the kitchen garden, or to cesspits inside and outside the house. People seem to be satisfied with the bucket type of drainage outside their houses. People were asked to identify where they dumped their garbage and dung. Every village said that they throw it outside the house, 120 had compost pits, 10 said near the cattle shed and 14 said that they used the public compost pits. The researchers observed that the compost pits made by the people were not deep and had become breeding places for flies and mosquitoes.

The general picture that emerges from this analysis is that the type of settlement, including the problem of pollution, does not seem to influence the thinking of the villagers. Except for the people living in isolated areas, people are not conscious of the extent and effect of the waste they take. It appears that the level of economic standard gives a significant role with regard to the sanitary practices. The attitudes towards latrines, disposal of garbage and other wastes is more positive in the economically better off villages.

only in some houses, were there separate latrines. In the other houses a space in the veranda or balcony is used as a latrine. Fifty-five of the respondents (28%) had places for bathing in the house. The others used the well or the handpump place for bathing.

In the question as to how satisfied they were with the arrangements for drinking water in their villages, 10% thought you can not say they were fully satisfied, 12 partially satisfied, while about 78 were not satisfied at all. There was quite a difference in the districts. In the districts in which there is government intervention, there was very great dissatisfaction.

With regard to sanitation arrangements only 28% were fully satisfied, 18% partially satisfied while 54% were not at all satisfied. Twenty-one per cent of the respondents were fully satisfied with the government's health skills. 18% were partially satisfied, 59% were not at all satisfied. In villages where medical facilities were available, the people indicated their satisfaction. In all the others dissatisfaction was expressed.

The trend of the responses seemed to be that only water supply, sanitary facilities, and proper drainage should be provided by the government. In the question asking for suggestions to improve the unsatisfactory situation, 144 persons (48%) said they the Government should do it, 14% did not respond to this question. There was no indication of any initiative being taken by the people themselves to solve any of these problems.

When asked about the personal problems, 54% mentioned poverty and unemployment, 28% educational and marriage expenses, etc., 14% water supply, 18% children and 12% electricity. Regarding the problems of the village - sanitation, education, medical facilities, communication and transport, water supply and electricity were mentioned in that order.

Barriers of Services

In the villages where hand-dwells were still the prevalent source of water, Barjans and in some cases other communities could not directly take water from the wells under any of other costs. They had their own arrangements. In case they had no arrangements of their own, they had to wait with their pitchers and canteens from the other side would take water from the wells and fill their pitchers. In the areas visited the problem was not although the Government has tried to fill wells for these communities in their own localities. In the areas where water supply is under the provision of handpumps or even from connected wells, the Barjans are allowed to take water but have to take to see that these purchases do not touch the pitchers of other caste people. Furthermore it is helping to remove untouchability as far as water supply is concerned.

Status of Women

Eighty percent of the respondents said that the women were fully consulted when decisions concerning the household were taken. 17 persons said that they were partially consulted and 13 said they did not get any consultation. When the respondents who had said "do not consult" were asked as to who they "did not consult" them, 17 out of 18 said "husbands were less intelligent" and the other said "no particular in the family". The questionnaire analysis showed that the women consult and the officers consult tended to consult the women. Across among the decisions it was equally divided between those who consult and those who do not. Among the women consulted hardly anybody consulted the women in the house. It was also found that social and religious problems were less ones in which the women were consulted. In questions of economic decision like where to sell the surplus, purchasing and selling property, etc. women were not consulted. There was no organization for women in the 13 villages surveyed.

To the question as to how women would utilize the loan given because of water supply made available to them, most of the respondents said that they would spend it in agricultural work, a few of them said that they would work more in the house while some suggested that they would start building and sewing. Only 13 persons (12) said that they would spend them in purchasing. About 12% said that this would allow them to save more money by some other means.

The upper castes still observed purdah. In the majority of other castes, there is only partial purdah (only covering the face). Among the scheduled castes about one-third observe partial purdah whereas one-third do not. Among the tribal communities all the women observe partial purdah.

It would, thus, seem in the rural communities the status of women is not very high.

Remarks

Of the 13 villages surveyed, only 3 were classified as no problem villages. In the majority of the areas, the major water system is the handpump. The same water source was used for all purposes. There seemed to be little knowledge with regard to the relationship between the health conditions and the source of water supply among the village people. It is interesting to note that water supply had a low priority when the question was asked as to what the

problems of the villages were, National Institutes are inadequate at most of the villages. Sanitation conditions are extremely unsatisfactory. The people depend on the government to solve the problems of the villages. While we can deplore their lack of dependence, a realistic assessment regarding the knowledge and the capacity of the people to solve their own problems would indicate that they have little alternative. Establishing a hospital is not only a complicated procedure but also an expensive proposition (it would cost anything from Rs 1,000 to Rs 50,000). There is not anything that the people cannot take some action on about one L.A. the maintenance of the handpump, digging latrines, making concrete pits as well as doing something about the drainage system. The hierarchical structure of the society has some bearing on the implementation of programs. The Government is making special efforts to provide for various services to the deprived groups, but in extremely villages, the deprived groups are not always able to utilize the benefits of the programs that are being implemented in the villages. In the supply of water some fact has to be taken into consideration.

The progress in the field seems rather slow. The financial constraints and the organizational limitations do not allow the very rapid expansion of the programs of supplying drinking water in the rural areas.

Only in terms of resources that appeared there are constraints

Before 1971, when Government was not aware, supply depended on wells in the villages. The need is for a continuous effort in making people realize the benefits to their health. If they do not take preventive action, at all present, there are no formalization of the basic. Sanitation operating at the village level. The contribution of the Community Health Centre who could function at the village level should provide an opportunity to introduce an educational programs with regard to primary health care.

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The study designed by the JEF was concerned with drinking drinking water supply and sanitation programmes were an integral part of the health programme. It was also concerned as to whether these components were within the overall National Development Policy and Plans. The research design had assumed that the lack of intersectoral coordination and the lack of cohesive programming were responsible for the failure of programmes. There was another assumption behind the study, namely that the emphasis of this failure has resulted in greater emphasis being given to integrated development. The data were collected at national, state and village level to look at the relationship between drinking water supply, sanitation, health and the development processes.

The drinking water supply programme seems to operate in isolation. At the national level, the Department which is responsible for water is different from that of health and the

at State. At present the agencies are either independent (although the Ministries are housed in the same building). The Ministry of Health does not seem to be very concerned with the programme of either water supply or sanitation. There is some effort by the CPWD to have a contact with the Ministry of Health and their support. There is scope for much greater coordination.

In one of the states studied there is a separate organization for the water supply and drainage programme. It operates in the Department of the Department of Health, Public Health, Sanitation, Rural Sanitation and Local Administration, etc. etc. as the State. Nevertheless, the programme seems to operate on its own. When the question was raised with some of the officials about the integrated approach, they said that while this was the policy in theory, in practice it was difficult to implement. They also said that their primary concern was to provide water to the rural areas. Drinking water was considered a basic necessity which had to be provided. While the need for having an integrated approach was recognized, they felt that they should not wait for this to be implemented before providing water. The assumption here is that without the basic facilities one cannot have a state of development. If the State does, there may be number of villages which have no access for drinking water. If the water supply is looked at as an necessity then the perspective of the problem will be different.

In the other state studied, the Public Health Engineering Department is in charge of the water supply. This Department is under the Ministry of Health but for all other practical purposes it operates as an independent organization. There is a little coordination between their programme and that of the Department of Health. In one of the villages studied, about one-third of the houses had been supplied with water. When the villagers were asked to show the consequences of the lack of water supply, they said that they had been asked to wait and had received no answer.

The water from the houses was let out into lanes where it stagnated and became a breeding place for mosquitoes. The situation was aggravated with the BBN. The feeling here was that the major job was to provide water to the people. They also had no targets which they have to achieve. When asked why making latrines should not be compulsory in those houses where taps were installed they said that the water will be used right alongside the point from which the taps in their houses.

The Rural Development Programmes either at the national or state level do not have a strong emphasis on water supply. At the national level the present credit programme which is one of the major programmes for P.W.D. development is the only one which relates to supply of drinking water. In fact, special villages have been being made through this programme for the supply of drinking water. The amounts are rather small. It may also be noted here that while there is a interest which is used for latrine facilities, other people use this as a source for drinking water. In the village, there is an understanding that when people wish to use water for drinking from the latrines they should pay for it.

The other question concerned the extent of the people's participation. The people in the rural areas is badly let and large expect the government to provide the facilities for them. One of the reasons for this is that in many instances the rural people do not have either the skills or the resources within the community to solve even of their problems. Even for minor repairs of the handpumps, the rural people depend on the government. When the question was asked as to who should take the initiative to overcome the unsatisfactory conditions of health and sanitation and water supply, the majority of the people said that the government should take the necessary steps. However in the comparatively better-off villages, there seems to be some feelings that the people themselves should do something to improve their lot. The overall situation is that the rural people live in poverty (it is estimated that about half the population live below the poverty line). Elected local bodies are the organizations through which development programmes will have to be implemented.

They have the power to tax so that some activities can be undertaken by themselves. The collection of tax has not always been easy or successful. In Tamil Nadu, however, the local bodies have imposed a tax and are collecting it. To go through the funds collected that, that payments were made to the state government for maintenance of the handpumps. Another effort in Tamil Nadu is towards the community in having a committee from the village in which the

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